AST ENGINEERING LIBRARY

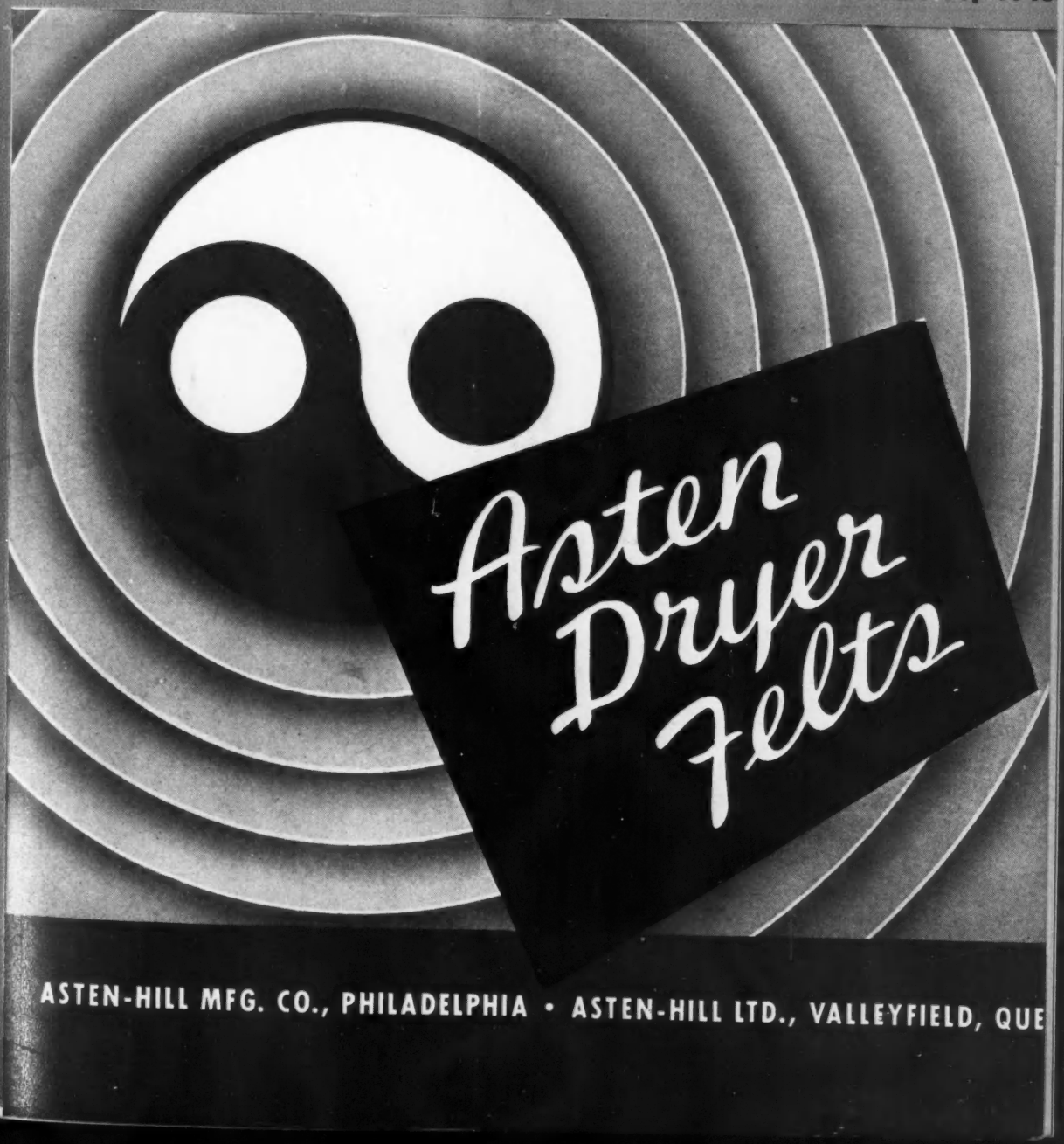
NOV 17 1948

# Paper TRADE JOURNAL

REG. U. S. PAT. OFF.

VOLUME 127, No. 20

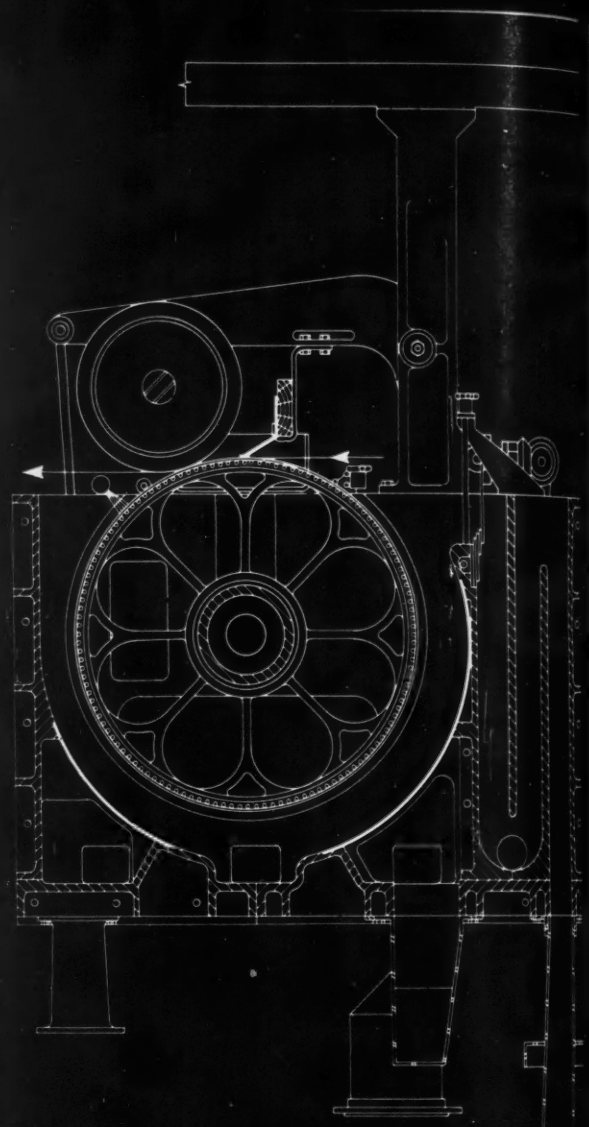
NOVEMBER 11, 1948



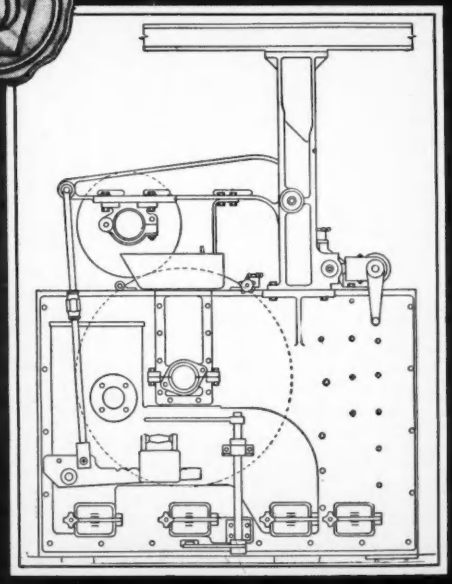
*Fourth of a Series of Vat Advertisements featuring Modern Designs now being built by the Downingtown Mfg. Co.*

# ALL METAL CONFLOW* VAT

## with Cast Iron Ends and Everdur Circle



The modern Downingtown CONFLOW* VAT, as its name implies, circulates the stock in a direction opposite to the rotation of the cylinder mould. The "all metal" construction of this vat has been preferred by many mills for years, the Everdur Circle being a more recent, added improvement. Stock Inlet and White Water Outlet are of steel. An Adjustable Making Board is included in the design of this vat, but there is no stock overflow. Leakage between the cylinder mould and vat ends is prevented by a new, special design of Chime Ring Sealing Strap. Both Couch and Cylinder Mould are mounted in anti-friction bearings. Vat is provided with ample clean-out facilities and everything about the design and construction of this and other modern Downingtown Vats is for continuous production of a well formed sheet having a uniform weight and caliper. Write us for more information.



DOWNINGTOWN MANUFACTURING COMPANY,
DOWNINGTOWN, PENNA.

# DOWNINGTOWN

Designers & Builders
Paper Making Machinery

* TRADE MARK

**Published**
**EVERY THURSDAY**
by
LOCKWOOD TRADE JOURNAL CO.
*15 West Forty-Seventh Street*
*New York 19, New York*
*Telephone: Plaza 7-2370*

•

GEORGE E. LOCKWOOD
*President and Treasurer*
ARTHUR E. GORDON
*Vice-President*
JOSEPH P. HORGAN
*Secretary*
H. G. HEITZEBERG
*Editor*
E. P. McGINN
*Industrial Editor*
E. P. NUTTALL
*Assistant Editor*
R. G. MACDONALD
*"TAPPI" Editor*
F. B. GROSSE
*Production Manager*

•

**REPRESENTATIVES:**

***Eastern***
BRUCE E. BROWN
EDWARD H. DOERING
15 West Forty-Seventh Street
New York 19, N. Y.
Phone: PLaza 7-2370

***Mid-Western***
H. K. VINTON
30 North Dearborn Street
Chicago 2, Ill.
Phone CEntral 6-2784
FRANKLYN H. OLSEN
1674 Sunview Road, So. Euclid
Cleveland 21, Ohio
Phone: EVergreen 5198

***Pacific Coast***
ROY M. McDONALD & CO.
544 Market Street
San Francisco 4, Calif.
Phone: YUkon 6-0503
639 South Wilton Place
Los Angeles 5, Calif.
Phone: Drexel 2590
Terminal Sales Building
Seattle 1, Wash.
Phone: Main 3860

***Southern***
EDWARD M. BUCK
1000 Main Street
Dallas, Texas
Phone: Riverside 5625

***Scandinavian***
Oxford Trading Aktiebolaget
Bibliotekgatan 6-8
Stockholm, Sweden

•

***Subscriptions:***
*Payable in advance.*
*By the year, $5.00*
*Single copy 15 cents.*
*Canada, $7.00*
*Other Foreign countries, $8.50*

MEMBER

Paper TRADE JOURNAL
Reg. U.S. Pat. Off.

**VOL. 127, NO. 20** **NOVEMBER 11, 1948**

# IN THIS ISSUE

| | Page |
|---|---|
| **Weyerhaeuser, Howard Smith and Babcock & Wilcox** | 7 |
| **Rayon Pulp Mill Using Sulphite Process** | 8 |
| **Canadian Fine Paper Market Slows** | 9 |
| **Tinker Stresses Industry—NSRB Cooperation** | 10 |
| **GPO Printing and Binding Needs** | 10 |
| **Canadian Pulp & Paper Ass'n Technical Section** | 12 |
| **The Paper Industry and The National Economy** | 13 |
| **Michigan Superintendents to Meet** | 14 |
| **Hydrafiner Treatment of Rag Stock** | 39 |
| **Method of Restoring Out-of-Round (Flat) Rolls of Newsprint** | 43 |
| **College-Industry Relations** | 43 |
| **U. S. Pulp and Paper Manufacture—Sept.** | 47 |
| **Further Duty Rate Reductions Proposed** | 47 |
| **Fundamental Physical—Chemical Characteristics of Melamine Resin Acid Colloid** | 49 |

**DEPARTMENTS**

| | Page |
|---|---|
| Trends | 22 |
| Imports | 24 |
| Prices | 25 |
| Markets | 28 |
| Financial Record | 30 |
| Production Ratio Report | 32 |
| Obituary | 32 |
| Meetings | 34 |
| Industrial Development | 39 |
| Literature | 46 |
| TAPPI Section | 49 |
| Classified Advertising | 60 |

**INDEX TO ADVERTISEMENTS ON PAGE 74**

Entered as Second Class matter at the postoffice at East Stroudsburg, Pa., under Act of Congress of March 3, 1879. Publication Office at Lockwood Trade Journal Co., Inc., 34 N. Crystal St., East Stroudsburg, Pa. Printed in U.S.A. Copyright 1948 by Lockwood Trade Journal Co., Inc. PAPER established Feb. 17, 1899, combined with PAPER TRADE JOURNAL, Nov. 16, 1899. PAPER established Sept. 21, 1910, combined with PAPER TRADE JOURNAL, February 19, 1926. All rights to the above titles reserved. Contents of PAPER TRADE JOURNAL, including all articles, illustrations, etc., are copyrighted and may not be reprinted except by permission. PAPER TRADE JOURNAL is indexed in *Industrial Arts Index* and *Engineering Index*. Also publisher of LOCKWOOD'S Annual DIRECTORY OF THE PAPER AND ALLIED TRADES.

# Vanesta

## The Starch Stabilizer

## Stops Gelling
## Improves Flow
## Gives Uniform Consistency

Sample on request

**R. T. VANDERBILT CO., INC.**

230 Park Avenue, New York 17, N. Y.

Paper TRADE JOURNAL
Reg. U.S. Pat. Off.

NOV. 11, 1948

VOL. 127, NO. 20

# Weyerhaeuser, Howard Smith and Babcock & Wilcox

## *Develop New Sulfite Recovery Process for Pulp Industry*

## *—Full-Scale Commercial Magnesium Bisulfite Mill Starting at Longview, Wash.*

**EDITOR'S NOTE: PAPER TRADE JOURNAL, through the courtesy of the Babcock & Wilcox Co., exclusive licensing agent, brings to its readers in this illustrated article, the first detailed report of a new process which if successful holds far-reaching potentialities for pulp manufacturers.**

NEW YORK—More than ten years of research, experimentation and equipment development by the Babcock & Wilcox Co., the Howard Smith Paper Mills, Ltd., and the Weyerhaeuser Timber Co. are culminating this month in the starting up of the Weyerhaeuser Timber Co., Pulp Division, 275-ton bleached sulfite pulp mill at Longview, Wash., it was disclosed on November 8. This is the first full scale modern pulp mill using magnesium oxide (MgO) as the base of the cooking acid used in the digesters for converting the wood chips into sulfite pulp in place of the traditional lime or calcium base in the 81-year history of the sulfite pulping process.

Weyerhaeuser has converted its existing mill, which used a calcium base cooking liquor and had the usual waste liquor disposal problem, to a cyclic magnesia base sulfite process in which the disposal problem is eliminated, the chemicals used in cooking the pulp are recovered for re-use, and a large amount of electric power generated.

The advent of a cyclic recovery system in the sulfite pulp process comparable in results to the cyclic recovery systems used in the soda and sulfate pulp processes is expected to have tremendously important implications for the future of the sulfite pulp industry and prove to be one of the outstanding advances in the paper industry.

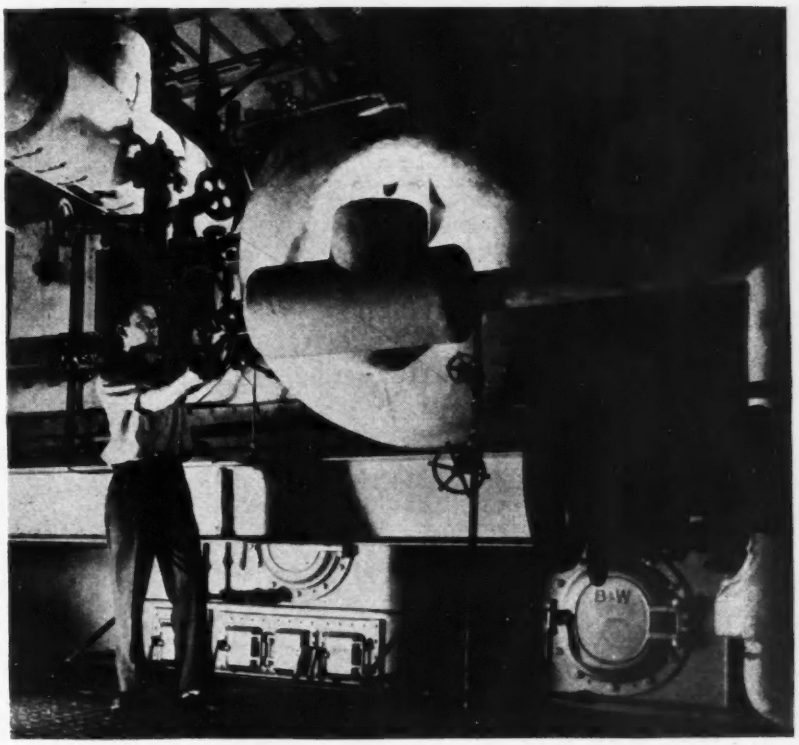
In 1937 the Babcock & Wilcox Co. and Howard Smith Paper Mills, Ltd., began joint experimental work with a pilot unit at the Cornwall, Ont., plant of Howard Smith. The Weyerhaeuser Timber Co., Pulp Division, became interested in the possibilities of a magnesium oxide base sulfite acid, and constructed and operated a pilot plant at Longview. Eventual collaboration by the three companies led to the decision that a full-scale commercial mill should be installed by Weyerhaeuser.

The Weyerhaeuser Timber Co. was particularly fitted to pioneer the commercial application of this development, because of its complete and diversified program of forest management and utilization. Its Longview plant spreads over 600 acres where the Columbia River takes its last big bend toward the sea, 50 miles away. Here a large sawmill, plywood plant, bark-products plant, a sulfite pulp mill and a sulfate pulp mill are integrated to use all grades and types of logs grown on Weyerhaeuser's St. Helens Tree Farm. The waste liquor recovery system is a further step in complete use of the growth of forest.

### Cycle of Recovery Process

Side-by-side with the recovery of chemicals in the form of magnesium oxide dust and sulfur dioxide gas is the production of heat and energy which will supply a large part of the power necessary to operate the sulfite mill. This double objective is achieved

*(Continued on page 34)*




**Sulfite recovery unit at Weyerhaeuser Timber Co., Longview, Wash., plant, viewed at steam-drum level.**

# Rayon Pulp Mill Using Sulphite Process

### *To Utilize Hardwoods*

NEW YORK—The first rayon pulp mill in the world designed to employ an entirely new process for producing dissolving woodpulp used in making rayon and other synthetic products will be built in the South by International Paper Co., it was disclosed on November 5 by John H. Hinman, president.

Significance of the development, according to Mr. Hinman, lies in the fact that for the first time hardwoods instead of softwoods can be used. The process is based on the sulphate (kraft) process instead of the traditional sulphite process.

Mr. Hinman said the exact location of the new mill has not yet been determined, but plans and engineering have been completed and construction is scheduled to be finished early in 1950. The mill will have a capacity of 300 tons a day, or a yearly capacity of about 100-thousand tons, and will increase by approximately 16 percent present estimated North American rayon pulp output. Construction and operation will be under the direction of the company's Southern Kraft Division.

"The new project," Mr. Hinman explained, "involves radical changes in the sulphate process and novel methods of purification and bleaching, resulting in a dissolving pulp which produces yarns and other end products of superior strength and which can be processed more rapidly, resulting in lower operating cost and considerable saving in capital investment."

The new process, Mr. Hinman said, combines the technical experience of International Paper Co. and its Canadian subsidiaries. It was developed by the company's Southern Kraft Division with the technical advice of Dr. Sigmund Wang, president, and the staff of Industrial Cellulose Research Ltd., wholly-owned research affiliate of Canadian International Paper Co., which operates at Hawkesbury, Ont., one of the world's foremost research and control centers for developing new techniques in the manufacture of dissolving woodpulps and in the conversion of pulp into end products by standard commercial processes.

"In this development, the 28-year operating experience of the Canadian International Paper Company mills has been fully drawn upon," he pointed out. "Canadian International Paper Company's Kipawa mill at Temiskaming, Quebec, started operation in 1920, and was the first mill in the world designed and equipped specifically for the production of these specialized pulps. Through expansion of Kipawa and the conversion of the Hawkesbury and Gatineau pulp mills to dissolving grades, Canadian International's dissolving pulp capacity has now reached 225,000 tons per year.

## Basing Point Pricing

"Senator Capehart has said that he may ask the 81st Congress to prevent the Federal Trade Commission from taking any further action on basing point price systems until the Congress passes effective legislation," E. W. Tinker, executive secretary of the American Paper & Pulp Ass'n., said on November 3.

"At a meeting in Chicago, William Simon, general counsel of the Capehart Committee, pointed out, 'It is difficult to find many pricing practices now generally used in industry, other than f.o.b mill selling, that are not suspected of illegality by the Commission,' Mr. Tinker continued.

"According to a release, Mr. Simon's memorandum hit hard on one point which appears to be the nub of and key to the Commission's policy.'

"'It is this: If a majority of manufacturers knowingly arrive at identical

## U. S. PAPER AND BOARD: PRODUCTION, BY TYPE, SEPT. 1948

(Story on Page 47)

(Tons of 2,000 pounds)

| Type of paper | 1948 September[1] | 1948 July* | September 1947 |
|---|---|---|---|
| ALL TYPES, TOTAL | 1,808,517 | 1,876,769 | 1,719,762 |
| Paper, total | 910,020 | 937,842 | 872,859 |
| Newsprint | 71,394 | 76,152 | 69,856 |
| Groundwood printing and specialty paper, total | 65,919 | 66,806 | 65,484 |
| Printing | 41,253 | 42,450 | 40,364 |
| Converting | 22,952 | 22,383 | 19,401 |
| Other | 1,714 | 1,973 | 5,719 |
| Book paper, total | 185,423 | 187,453 | 180,432 |
| Printing | 141,258 | 142,447 | 133,840 |
| Converting | 37,212 | 38,667 | 43,122 |
| Other | 6,953 | 6,339 | 3,470 |
| Fine paper, total | 97,578 | 99,455 | 101,775 |
| Writing, total | 73,114 | 74,038 | 74,820 |
| Rag (including index) | 11,074 | 11,003 | 13,421 |
| Chemical wood pulp | 62,040 | 63,035 | 61,399 |
| Cover and text | 5,780 | 6,376 | 7,335 |
| Bristols (except rag index) | 11,339 | 11,988 | 12,550 |
| Thin | 5,783 | 5,410 | 5,596 |
| Other | 1,562 | 1,643 | 1,474 |
| Coarse paper, total | 256,368 | 274,874 | 233,492 |
| Glassine, greaseproof and vegetable parchment | 10,053 | 10,041 | 11,154 |
| Wrapping, total | 67,125 | 66,464 | 65,040 |
| Unbleached kraft | 33,090 | 31,406 | 28,868 |
| Other | 34,035 | 35,058 | 36,172 |
| Bag, total | 55,702 | 63,616 | 44,730 |
| Unbleached kraft | 51,217 | 58,673 | 41,079 |
| Other | 4,485 | 4,943 | 3,651 |
| Shipping sack | 55,291 | 58,228 | 45,259 |
| Converting, total | 68,197 | 76,525 | 67,309 |
| Unbleached kraft | 39,678 | 44,706 | 37,953 |
| Other | 28,519 | 31,819 | 29,356 |
| Special industrial | 24,999 | 21,677 | 22,870 |
| Sanitary | 79,255 | 79,725 | 71,854 |
| Tissue | 18,954 | 19,035 | 18,708 |
| Absorbent | 8,093 | 8,502 | 7,966 |
| Building paper | 102,037 | 104,163 | 100,422 |
| Paperboard, total | 766,045 | 801,332 | 729,999 |
| Liners | 274,964 | 315,914 | 245,290 |
| Corrugating material | 111,060 | 101,437 | 113,806 |
| Container chip and filler board | 23,287 | 25,889 | 25,479 |
| Folding boxboard (for use in folding box plants only) | 179,445 | 174,906 | 175,260 |
| Set-up boxboard (for use in set-up box plants only) | 51,347 | 48,009 | 47,707 |
| Cardboard | 6,163 | 7,299 | 6,207 |
| All other paperboard | 119,779 | 127,878 | 116,250 |
| Wet machine board, total | 10,682 | 10,860 | 11,605 |
| Shoe board | 4,034 | 4,003 | 4,232 |
| Binder board | 3,353 | 3,297 | 4,455 |
| Other | 3,295 | 3,560 | 2,918 |
| Building board | 121,770 | 126,735 | 105,299 |

* Revised.

[1] These data are estimated to give 100 percent coverage of the industry. The proportions of estimate are as follows: Fine paper, 4 percent; Sanitary, 9 percent; Tissue, 12 percent; Cardboard, 4 percent; Wet machine board, 10 percent; Building board, 5 percent; and All other grades of paper and paperboard, less than 3 percent. Data for September are preliminary and will be revised in the October report.

prices, even though the smaller prices come about as a result of active competition, they create an economic effect indistinguishable from conspiracy.

"'This conscious parallel action is held to be illegal by the Federal Trade Commission.

"'One or even two sellers may absorb freight to meet or match the lower price of a competitor closer to the customer, but when it becomes a general practice it is collusion even if it is not a conspiracy. The legality of a seller's pricing practice thus depends on what practices his competitors follow.

"' . . . Since virtually all uniform delivered prices, uniform zone prices, freight collusive systems, and basing point systems result in varying mill net returns, only f.o.b. mill pricing is nondiscriminatory'."

## Lithopone Outlook

NEW YORK—The trend is encouraging in the increased availability of some of the pigments for whitening, brightening and opacifying many grades of paper, R. Davison, manager of the market development division of the New Jersey Zinc Co., reports to *Paper Trade Journal*. "This is particularly true of lithopone," Mr. Davison said, adding: "Restrictions which made it difficult for paper manufacturers to follow normal manufacturing procedure since before World War II have disappeared far enough into the background so that at least this one of the opaque pigments is becoming readily available, with definite signs that the situation in others is improving.

"Manufacturers of papers where only limited pigmentation is possible are able to segregate their limited supplies of higher priced pigments for such papers and to substitute lithopone in papers where more filler can be incorporated.

"This augurs renewal of the interest by both manufacturers and users of opaque papers which was growing so rapidly before developments in this field were restricted by conditions beyond their control."

## Drouth Perils Newsprint

MONTREAL—More than half of Canada's newsprint capacity may be affected by the drought which threatens power output in Quebec Province.

Although generating capacity of hydro-electric plants is adequate, power companies have intimated that some cutback in deliveries, probably about ten percent may be necessary unless heavy and continuous rains come before freeze-up. Rainfall here in October was only 2.17 inches, which is 34 percent below normal.

Among mills in the drouth area are Consolidated Paper, Canadian International Paper, Donnaconna Paper, Quebec North Shore, Lake St. John Power & Paper, St. Lawrence Paper Mills, Price Bros., Anglo-Canadian Pulp & Paper Mills, Howard Smith Paper Mills and E. B. Eddy Co.

**FIRST MASSACHUSETTS TREE FARM**

**Commissioner Arthur T. Lyman of the Massachusetts Department of Conservation, (left) awards first Gold Seal Tree Farm Certificate to Robert H. Lawton, extreme right. Col. W. B. Greeley, chairman of the board of trustees of AFPI, and R. B. Parmenter, extension forester for Massachusetts, left to right in center, look on. . . . Award was made at ceremonies at Athol, Mass., when the Bay State's first Tree Farm, a 620 acre tract planted in 1932 to white pine, red pine and spruce by Mr. Lawton in 1932, was dedicated on October 5, 1948.**

## Issuing Foreign Guide

NEW YORK—A guide for American business firms advertising in foreign countries who wish to use their newspaper and magazine space and radio time to correct misconceptions about the United States and to explain the motives of our economic aid to other countries, was issued on November 11 by The Advertising Council, 11 West Forty-Second street. The booklet was prepared in consultation with the United States Information Service of the Department of State.

## Seeking New Home

SAVANNAH, Ga. — The Herty Foundation Laboratory, located for some 17 years at 510 West River street in quarters made available at no cost by the Savannah Electric & Power Co., will have to find new quarters.

A spokesman for the Savannah Port Authority said the latter organization was considering ways and means to secure a suitable location for the laboratory. A site at the former Southeastern Shipyards is among the locations under study.

# Canadian Fine Paper Market Slows

TORONTO—Recent weeks have seen a change in the market for fine papers in Canada. There has been a sharp decline in export business with Australia, New Zealand and South America. Currency and exchange problems are mentioned as among the reasons for this decline. Wholesalers of fine papers state that whereas orders used to be placed three and four months ahead by domestic users so that they would be sure of deliveries by the time the paper was required, orders are now being filled so quickly that finding storage space has become a problem.

Softening of the fine paper market was indicated the week ended October 30 in an announcement by the Rolland Paper Co. that its directors had decided to omit the quarterly common dividend of 15 cents a share which would have been payable November 15.

E. Howard Smith, president of the Howard Smith Paper Mills, Ltd., agreed that the fine paper outlook had altered. "You have to get out and sell fine papers today," he said.

Paper wholesalers admitted there was an over supply of fine papers available at the moment, and that it will be the end of the year before their stocks are reduced to normal once more. It is reported that, in the meantime, practically no purchases are being made from manufacturers, although prices are holding firm.

Rolland specializes in high quality rag stock papers, which have been in easier supply than some of the sulphite bond papers, and, some say, would ordinarily be the first to feel any setback in the fine paper market, because it purchases pulp on the open market, whereas Howard Smith and E. B. Eddy are integrated mills, using their own pulp, and, in the case of Howard Smith, selling part of their pulp production.

# Tinker Stresses Industry–NSRB Cooperation

NEW YORK—Explaining the relationship between the pulp and paper industry at the National Security Resources Board, A. W. Tinker, executive secretary of the American Pulp and Paper Ass'n., bulletined members on November3 in part, as follows:

"The National Security Resources Board is a permanent civiilan organization of the Untied States Government. It reports directly to the President. The Board at present consists of the Secretaries of Agriculture, Commerce, Defense, Interior, Labor and Treasury. Its civilian Chairman is Arthur M. Hill.

"The staff of the Security Resources Board is composed of career government employees and men from private life who serve full time, or in an advisory or part-time capacity. In addition, the Board uses the services of Advisory Committees, Task Forces and Consultants from industry, agriculture and labor, educational and scientific institutions, and various government agencies.

"The responsibility of the NSRB, as defined in the National Security Act of 1947, is to advise the President concerning the coordination of military, industrial and civilian mobilization in the event of war. Its principal activity is the formulation of effective, workable plans for the complete mobilization of the nation's raw material, agricultural, industrial and manpower resources, and the development of programs for the maintenance and stabilization of a healthy civilian economy in time of war.

"Other responsibilities of the Board involve the formulation of policies and plans for unifying, in time of war, the activities of Federal agencies and departments concerned with production, procurement, distribution and transportation of military and civilian supplies, and the establishment of adequate reserves of strategic and critical materials.

"In short, the National Security Resources Board, together with the Munitions Board and our Armed Forces, is completely responsible for our national defense. Should the necessity arise, its plans would vitally affect every man, woman and child in this country. The importance of its work cannot be overemphasized.

"The pulp and paper industry, in common with all other industries in this country, is vitally concerned in the work of the NSRB. In the event of war, it will function effectively and will emerge as a going concern capable of meeting the peace-time requirements of this nation—or it will be so handicapped and restricted that it will be many years before it can regain its essential position in our national economy.

"It is therefore clearly the duty of every mill and executive in the industry to participate in the work of the National Security Resources Board to whatever extent opportunity permits. The industry knows by the experience of the last war that its products are essential to successful military action and the maintenance of an effective war-time civilian economy. That knowledge and the ability, through adequate planning and preparation for the fullest use of its resources, in the event of war, must be our contribution to the work of the NSRB. It is our business, as well as that of the NSRB, to see that the pulp and paper industry's productive facilities and personnel are fully utilized in the planning being done by the Security Board. Our stake is not only the industry's utmost contribution to national defense, but also the preservation of its essential position in our national economy."

# GPO Printing and Binding Needs

WASHINGTON—Sealed proposals will be received at the U. S. Government Printing Office, Office of the Public Printer, until ten o'clock, a.m., November 15, and immediately thereafter opened, for furnishing paper boxes, cartons and containers, including knocked down paper boxes for packing letter paper, for the use of the GPO. The materials are specified in "Proposal for Material for the Public Printing and Binding for the Term of Six Months, Beginning January 1, 1949," as follows:

### Knocked-Down Paper Boxes For Packing Letter Paper

*No. 210*—1,500 lbs. Paper Boxes, 10⅝ by 8½ by 2½ inches, inside dimensions (sample required to show construction of box).....per M

### Postal-Card Carton Boxes

*No. 211*—2,500,000 lbs., Cartons, "C", 5$\frac{5}{16}$ by 5¼ by 3¼ inches, inside dimensions, openings to be on the 5$\frac{5}{16}$ by 5¼-inch sides; to be securely wrapped and tied in packages of 300 cartons each (sample required to show construction of carton). Sample will be furnished to bidder upon request, to show style of cut desired on notched top and bottom flaps.

*No. 212*—300,000 lbs., Cartons, "B", 6¾ by 5$\frac{5}{16}$-inch sides; to be securely wrapped and tied in packages of 300 cartons each (sample required to show construction of carton). Sample will be furnished to bidder upon request, to show style of cut desired on notched top and bottom flaps .....per M

### Corrugated Fiber Postal-Card Shipping Containers, Card Containers

*No. 213*—2,500 lbs., Containers, No. 1, 27½ by 11¾ by 6¾ inches, inside dimensions, openings to be on the 27½ by 11¾-inch sides; to be tied in unwrapped packages of 25 containers each. .....per M

*No. 214*—100,000 lbs., Containers No. 2, 17½ by 11¾ by 10⅝ inches, inside dimensions, openings to be on the 17½ by 11¾-inch sides; to be tied in unwrapped packages of 25 containers each. .....per M

*No. 215*—5,000 lbs., Containers, No. 3, 17½ by 11⅜ by 5¼ inches, inside dimensions, openings be on the 13½ by 11¼-inch sides; to be tied in unwrapped packages of 25 containers each. .....per M

*No. 216*—3,000 lbs., Containers, No. 5, 13½ by 11¼ by 5⅝ inches, inside dimensions, openings to be on the 13½ by 11¼-inch sides; to be tied in unwrapped packages of 25 containers each. .....per M

*No. 217*—10,000 lbs., Containers, No. 7, 11 by 5¾ by 6¾ inches, inside dimensions, openings to be on the 11 by 5¾-inch sides; to be tied in unwrapped packages of 25 containers each..... .....per M

*No. 218*—3,000 lbs., Containers, No. 8, 11⅜ by 6¾ by 5⅝ inches, inside dimensions, openings to be on the 11⅜ by 6¾-inch sides; to be tied in unwrapped packages of 25 containers each..... .....per M

*No. 219*—10,000 lbs., Containers, No. 11, 14 by 13½ by 11¼ inches, inside dimensions, openings to be on the 14 by 13½-inch sides; to be tied in unwrapped packages of 25 containers each. .....per M

### Sheet Postal-Card Shipping Containers

*No. 220*—30,000 lbs., Containers, No. 12, inside dimensions 32¾ by 22½ by 2⅝ inches with due allowance for the thickness of the inside pads; to be tied in packages of 25 containers each. Two pads must be supplied for each container, to be tied in packages of 25 each.....per M

### Metal Ink Containers; Slip Top

*No. 221*—1,000 lbs., Containers for 5 lbs. Offset Ink.—6½ inches diameter by 4¼ inches height, inside dimensions. Capacity: Not less than 127.5 cubic inches. Standard deep slip covers. Can edge to be rolled. All seams soldered.....per M

*No. 222*—1,000 lbs., Containers for 5 lbs. ink.—7¼ inches diameter by 4 inches height, inside dimensions. Capacity: Not less than 165.4 cubic inches. Can and cover edges to be rolled. All seams soldered.....per M

*No. 223*—1,000 lbs., Containers for 10 lbs. ink.—8¾ inches diameter by 5 inches height, inside dimensions. Capacity: Not less than 300 cubic inches. Can and cover edges to be rolled. All seams soldered.....per M

### Glass Containers

*No. 226*—100 gross, 2-13/64 Flint Glass, Round Ink Bottles
Capacity: 2-13/64 ounces.
Diameter: 2 inches.
Body Height: 1½ inches.
Over-all height: 2¼ inches.
Finish: 30½ C.T. smooth.
Color: White.
Closure: Screw cap 30½ MM. Metal or plastic lined with waxed or enamel faced liner.
Bottles and caps to be shipped unassembled..... .....per gross

### Corrugated Containers

*No. 227*—100,000 lbs., Containers, 16½ inches by 11 inches by 9 inches inside dimensions, openings to be on the 16½ inches by 11 inches sides; to be tied in unwrapped bundles of 25 containers each.....per M

*No. 228*—150,000 lbs., Containers, 18½ inches by 12½ inches by 7 inches, inside dimensions, openings to be on the 18½ inches by 12 inches sides; to be tied in unwrapped bundles of 25 containers each.....per M

## N. Y. QM Awards

NEW YORK—Awards have been made by the New York Quartermaster Purchasing Office, 111 East Sixteenth street, on QM-30-280-49-249 covering napkins, paper embossed, size 13 x 13 inch and 18 x 18 inch, to: Winchester Paper Co., Ashuelot, N. H.—82,000 M 13 x 13 inch @ $.73709 M; and White-Washburne Co., Inc., New York City—2,000 M 18 x 18 inch @ $1.665 M.

QM-30-280-49-323 covering Paper, Map and Chart, printing, Fluorescent, 45 x 60 inch (basis 17 x 22-48/1000), and Paper, Map White, high wet strength non-fluorescent, size 45 x 60 inch, to: Barton, Duer & Koch Paper Co., Washington 2, D. C.—1,000 reams @ $68.07 ea.; and Walker Goulard Plehn Co., New York City—700 reams @ $28.37 ea.

## Despite Import Restrictions

OTTAWA—In face of the severe import restrictions established by the Canadian Government due to the shortage of U. S. currency, the latest report of the External Trade Branch of the Canadian Government here shows the following imports for the first eight months of 1948 ending August, in the case of American shipments into Canada:

Paper mill machines and parts, $1,128,793; pulp mill machines and parts, $293,778; paper working machinery, $4,028,643; soda pulp unbleached, $1,781,816; sulphite pulp bleached, $230,361; wood pulp mechanical, $24,224; sulphite pulp dissolving bl., $403,240; millboard and binders board, $152,563; pulpboard for manufacture of wallboard, $423,960; wallboard building board, $239,492; pulpboard other fibreboard, $328,892; book printing litho paper, $323,079; surface coated paper, $206,156; greaseproof and glassine papare, $114,423; duplex backing paper, $174,491; bond and ledger papers uncut, $263,695; waste paper, $901,457; electric cable insulating paper, $316,998; photographers paper, $536,635; cigarette paper ungummed, $421,191; paper matrix for printing, $146,625; paper, photo baryta coated, $238,545; facial tissues handkerchiefs, $492,841; cable insulating paper, $40,658; filter paper, $153,282; tabulating paper and stock, $212,587; bags and sacks of paper, $336,120; containers paperboard, $423,022; manufactures of paper, not otherwise provided, $1,376,777; shipping containers, $333,100; all kinds of paper not otherwise provided, $462,774.

This detailed report shows other imports from the United States so far this year in paper and pulp lines, reaching impressive figures in comparison with the restrictions as reflected in imports of other items into Canada.

## Canadian Newsprint Exports

OTTAWA—Canadian exports of newsprint paper advanced to $36,939,000 during September this year compared with $28,214,000 in the same month a year ago and reached a total of $277,953,000 in the Jan. - Sept. period as against $249,597,000 in the corresponding period last year, the External Trade Branch of the Canadian Government reports.

Exports from Canada of other paper also increased to $2,769,000 in September compared with $2,356,000 in September last year and rose to $25,275,000 in the Jan.-Sept. period as against $22,481,000 a year ago in the similar period. Exports of wood pulp amounted to $19,082,000 during September compared with $15,617,000 last year in the same month and totaled $158,633,000 in the Jan.-Sept. period this year in comparison with $128,794,000 last year in the same period.

**L. S. KIMBALL**

**—recently named general manager of the Angier Corp., Framingham, Mass., manufacturer of waterproofed and reinforced paper for building and industrial packaging applications.**

## Paper House for Arctic Use

WASHINGTON—The Navy has a new prefabricated house designed for 65-below-zero weather. The walls of paper honeycomb are covered with twin aluminum "skins," yet the unit can withstand 50-mile-an-hour gales and the weight of 13 feet of snow, the Navy said.

Seabees will make it their home in Point Barrow, Alaska, this winter.

## U.K.-Canadian ECA

WASHINGTON—Fourth-quarter, 1948, procurement authorizations of pulp, paper and paper products for the United Kingdom from Canada, announced the week of November 2, total $6,600,000. It is understood that the "pulp" referred to means in all cases, wood pulp, although the ECA reports do not distinguish between pulpwood and woodpulp.

## Metallizers' Tulsa Meeting

TULSA, Okla. — The annual meeting of the American Metallizing Contractors Ass'n. will be held at the Mayo Hotel on December 2-4 when that group will celebrate its first anniversary.

Composed of the more prominent contractors of America, AMCA conducts a research and development program, an educational campaign, and an information service. It is a nonprofit organization.

On the agenda at the meeting are the following events:

"Bonding Methods Used in Metallizing," an address by Peter G. Dennison, president of the Metal Spraying Corp. of Milwaukee. A round-table discussion on "The Economic Aspects of Operating a Metallizing Contract Shop," to be led by Manley Clark, general partner of Clark & Co., Newport Beach, Calif.

The feature event will be the dinner meeting on December 3, when William C. Reid will address the group on "Metal Spraying in England."

Walter B. Meyer, 773 Brownell avenue, St. Louis 22, Mo., is secretary of the Association.

## Paper & Twine Ass'n.

CINCINNATI—Directors of the Paper & Twine Ass'n., meeting in Chicago on October 28, decided to hold the next annual meeting of the Association at French Lick Springs, Ind., on June 17-18, 1949. It was also decided to hold a debate at the June meeting, to be participated in by manufacturers, converters and wholesalers, on a subject to be selected.

A committee was appointed to look into the feasibility of an evening dinner meeting with entertainment during the Chicago convention of the National Paper Trade Ass'n., next fall.

The directors instructed Secretary John L. Richey to look into the development of a good-will program between British paper manufacturers, converters and wholesalers and the American paper industry.

## Californians Meet Nov. 18

LOS ANGELES — The November 18 meeting of Papermakers and Associates of Southern California will be held at Ivan's Restaurant, 12120 Long Beach Boulevard in Lynwood. Charles Ross of Du Pont will show a picture entitled "Color Dynamics" with special reference to color harmony in paper mills.

## "Paper" Basic Analysis

NEW YORK—"Paper" is the subject of a Basic Analysis published by Standard & Poor's on November 5 in its series of industry surveys. Features of the analysis include wood pulp, preferred stocks, paper board, kraft, book and fine paper, newsprint, financial data, a ratio analysis and a stock price chart.

# Canadian Pulp & Paper Ass'n Technical Section

***Meets in Montreal, January 26-28***

MONTREAL—The 1949 Annual Meeting of the Technical Section, Canadian Pulp & Paper Ass'n., will be held in the Mount Royal Hotel, on January 26-28.

The program will cover all phases of pulp and paper manufacture, including subjects of interest to management and operating personnel. Some of the papers listed on the tentative program are as follows: "Corrosion of Alkaline Pulping Mill Equipment"; "Reduction of Maintenance Costs on Barking Drums through Application of Welding"; "A Means of Increasing Decker Wire Life"; "New Developments in Engineering"; "Improved Wood Room Layout"; "The Role of Sectional Electric Paper Machine Drives in a Modernization Program"; "Hypothetical Application of Heat Pumps to Paper Machine Dryers"; "Groundwood Mill and Screen Room Heating and Ventilation"; "An Improved Stoker Capable of Handling all Types of Canadian Coals"; "Industrial Relations"; "Instrumentation Studies—Mullen Tester"; "Analysis of Kraft Liquors"; "Modified Mullen Tester in Use at Iroquois Falls"; "Steam Jet Refrigeration System for Sulphite Acid Making"; "Treatment of Slime with Hypochlorite"; and "Wheat Straw for Improved Paper and Board Products."

The following group discussions are also scheduled:

*Board* (1) Drying of Paperboard; (2) Gloss Ink Printing of Paperboard.

*Fine Papers* (1) Material Handling.

*Mechanical Pulping* (1) Modernization of Smaller Groundwood Mills; (2) Screening of Mechanical Pulp.

*Newsprint* (1) Modernization and speed up of equipment in newsprint mills.

*Process Instrumentation* (1) On the Job Training of Instrument Mechanics.

*Sulphite* (1) The Operation of Rotary Screens for Sulphite Pulp.

*Waste* (1) Evaporation of Waste Sulphite Liquor—Symposium of four informal papers.

*Wood Chemistry* (1) Hemi-celluloses. a. Chemistry. b. Effect of hemicelluloses on the properties of pulp and paper.

Group Discussions, to be programmed by the Engineering and Heat and Power Commitees are not finalized but will be included in the program.

It is expected that an official visit to the Pulp and Paper Research Institute of Canada will be programmed, so that delegates may see the new pulping laboratory and other facilities of the Institute. Opportunity will be afforded delegates to discuss with members of the staff, the intensive research program at the Institute.

*The Technical Section does not handle room reservations.* Requests for accommodation should be addressed directly to the hotel and should include information concerning arrival and departure times. Delegates are requested to advise the hotel of any changes in plans concerning hotel accommodation.

## Duplessis Bans Expansion

MONTREAL—Reports that Gulf Pulp & Paper plans to spend $1,000,000 on new plant machinery was followed closely by a statement from Premier Maurice Duplessis that his Government would not permit any increase in the production of pulp and paper mills in the Province.

Mr. Duplessis singled out the bankrupt Quebec Pulp & Paper Mills Co. at Chicoutimi as a possible exception to this policy.

It had previously been reported that Gulf Pulp was planning to install a newsprint machine at its Clarke City plant. At present this company manufactures groundwood pulp and mechanical screenings. P. S. Collier, managing director of Gulf Pulp, owned by Lord Camrose interests, stated that his company was now negotiating with the Government toward an adjustment of timber limits.

The Duplessis statement is taken to mean here that the province will not permit any additional drain on the forest resources for the sake of increasing production.

## Discrimination Alleged

VANCOUVER, B. C. — G. R. Bolton, speaking for the paper industry in British Columbia, before the Board of Transport Commissioners in connection with freight rates hearing, stated that the mountain differential was driving British Columbia products out of the prairie market. He said one coast firm would leave that market completely in December.

Mr. Bolton asserted that prohibitive freight rates made competition impossible and that the British Columbia paper industry was paying from eight to 25 percent more to move products to prairie markets than would eastern manufacturers who were shipping their products an equal distance.

## Management Problems

NEW YORK—An American Management Ass'n. survey of 1,000 companies throughout the United States shows the eight most pressing problems currently confronting production executives in their attempt to lower costs and increase output and quality are (1) Insufficient employe interest in increased production. (2) Inability to meet customer deliveries because of uncertainty of deliveries from suppliers. (3) Maintenance inefficiency causing time lost for repairs. (4) Less than maximum effectiveness in physical handling of materials in the manufacturing process. (5) Inadequate leadership by foremen and supervisors. (6) Lack of sufficiently close coordination between production engineering and sales. (7) Inadequate inventory controls in scheduling full use of equipment for plants producing a wide variety of products. (8) Interruptions of production where design changes rapidly.

## Receipts Nearly Doubled

Receipts from the operation of national forests for the three months ending September 30, the first quarter of fiscal year 1948-49, were almost double those for the corresponding period last year, the Forest Service in the U. S. Department of Agriculture reported on October 28. Total receipts for the period July 1 to September 30 of this year were given as $10,104,668 as compared with $5,535,552 for the same three months in 1947, an increase of $4,569,116. About 96 percent came from timber sales. The returns for the quarter were the highest for any quarter since the National Forests were established.

## Sept. Merchant Sales

WASHINGTON — September sales reported by 58 wholesalers in paper and paper products amounted to $8,023,000, up two percent from August, but two percent under those in September a year ago, the Bureau of Census reported on November 2.

Sales for the first nine months this year reflected no change from the corresponding months of 1947, the Bureau reported.

Inventories reported by a sampling of 29 firms were 30 percent higher this September than in 1947, but were down one percent from August.

## Three-Way Deal

MONTREAL — More newsprint for fewer dollars will be the result of a three-way deal between Canada, United Kingdom and Australia by which United Kingdom will import sulphite pulp and pulpwood from Canada, and manufacture newsprint for export to Australia.

Under the arrangement, Australia will reduce its imports of Canadian newsprint this year by 11,000 tons —

$1.1 millions at $100 per ton. With these dollars it is purchasing 5,800 tons of sulphite pulp and 25,000 cords of pulpwood, from Canada. To this United Kingdom is adding some of its own groundwood pulp, to be paid for in sterling. All-told the groundwood, pulpwood and sulphite pulp is expected to make 42,000 tons of newsprint for Australia. By this method it is claimed that Australia will get 42,000 tons of newsprint for the same dollar expenditure required for only 11,000 tons if the newsprint were purchased in Canada.

### Specifications-Quality

WORCESTER, Mass. — The Specifications and Quality Control joint meeting of the New England District of the American Society for Testing Materials and the New England Section of TAPPI will be held at the Sheraton Hotel on November 19.

Dinner will be served at 6:30 p.m., following which two papers will be presented, as follows:

"The Philosophy of Specifications," by Wm. R. Willets, in charge of the paper development laboratory of the Titanium Pigment Corp., and Dr. Lewis S. Reid, assistant general purchasing agent of the Metropolitan Life Insurance Co.

"Practical Quality Control," by Dr. George P. Wadsworth, associate professor of mathematics at M.I.T.

Reservations for the meeting are to be made directly to R. H. Doughty, Fitchburg Paper Co., Fitchburg, Mass.

### Casein Output Drops

WASHINGTON — Dry casein production amounted to an estimated 825,000 pounds in September, the Department of Agriculture reported November 3. This is a decline of 67 percent from a year earlier, and the lowest output for September in the past 25 years.

Production in the first nine months of 1948 totaled 11,110,000 pounds, 60 percent less than for the corresponding 1947 months. Stocks held by manufacturers at the close of the month totaled 3,700,000 pounds, 45 percent above those in September, 1947, and somewhat above the August, 1948, holdings.

### Bowater Deal Approved

OTTAWA—The report that the Bowater Paper Mills group in Britain has obtained Board of Trade approval of a deal whereby 25,000 cords of Canadian logs and 4,500 tons of Canadian sulphite pulp will be imported to provide newsprint for export to Australia is interpreted here as probably aiming to provide work for British mills and at the same time enable Australian sources to pay for newsprint in sterling instead of dollars.

### 800 Attend Joint Dinner

CHICAGO — The Paper & Twine Ass'n's. joint meeting with the Salesmens Ass'n. of the Paper Industry during the recent NPTA Convention was attended by approximately 800 persons.

# The Paper Industry and The National Economy

CHICAGO — Addressing the National Paper Trade Ass'n. at Hotel Stevens on October 28, E. W. Tinker, executive secretary of the American Paper & Pulp Ass'n., said in part:

" . . . the paper industry is so interwoven in the national economy that the use of paper and its availability becomes just as much a problem as that of most critical material," Mr. Tinker said, referring to 1949 ECA and national defense expenditures. " . . . the conclusion is inevitable that the national defense program must be given most serious consideration in judging the outlook for the paper industry during the year 1949."

"The industry's experience with the national defense program, prior to World War II, and during the war, led to the conclusion that the industry must cooperate with the National Security Resources Board in particular, and other governmental agencies involved in the program. . . . We urgently desire that competent individuals be brought into the picture in Washington, particularly in key positions. . . . I am glad to say that we have made progress to the extent of having recommendations accepted covering the two key jobs with which we were primarily concerned in the National Security Resources Board. Additional personnel will be required.

"We are informed that the Security Resources Board will perfect plans of action that can be put into effect in case of a national emergency, or in case of necessity in the development of a national defense program, which plans may control the industry's operation from the woods to the finished product. We are encouraged to believe that full advantage will be taken of the experience gained during the last war and if advantage is taken of the industry's cooperation, through advisory committees, and the employment of competent personnel, a minimum of confusion and unnecessary disruption will occur.

" . . . the pulp and paper industry has not been an industry characterized by speculative profits. However, . . . in periods of depression it has characteristically stood in a favorable position or, in other words, it could be classified as a relatively stable industry. To illustrate, in 1932, the low year for all industries including the paper industry, the production ratio to capacity for paper was 58 percent; for steel 20 percent. The employment index for the same year (with 1923 = 100), for paper was 83.5; for all manufactures 60.4. Profits, net after taxes, related to net worth was for paper —2 percent; for all manufactures —4 percent. The seasonal variation in employment in the paper and pulp industry is the lowest of the 21 major industries surveyed by the National Industrial Conference Board. . . . "

**UPSON MEN UPPED**

**Left—H. Roy Walton, newly appointed assistant Eastern sales manager of the Upson Co., Lockport, N. Y. . . . Right—Hugh A. Ward, successor to Mr. Walton. . . . Mr. Walton previously represented Upson in New York City and Mr. Ward in Cleveland.**

### Richey Addresses SAPI

CHICAGO — "The Probable Effect of Rearmanent and World Rehabilitation on the Paper Industry" was the theme of the Western Division meeting at Hotel Sherman on November 8. The speaker was John L. Richey, executive secretary and general counsel of the Paper & Twine Ass'n., who discussed the impact on the paper industry of the nation's military preparedness program, the Marshall Plan, the ERP and the ECA.

### Canadian Car Loadings

OTTAWA—Car loadings on the Canadian railways from the first week of this year until the week ending October 23 reached a cumulative total of 183,172 cars of woodpulp and paper, compared with 177,851 cars of same in the similar period last year ending week of October 25, the Transportation & Public Utilities Branch of the Canadian Government reports.

### Waste By-Product Studied

LANSING, Mich. — The Stream Control Commission has been informed by the city of Munising that plans for a plant to halt pollution of Munising Bay and the Anna River are ready. The Munising Paper Co. told the Commission it is studying methods of creating byproducts from wood pulp wastes.

### Canadian Exports Climb

MONTREAL — Canadian pulp and paper exports in 1948 will top $650,000,000 on the basis of nine-month totals. With three months to go, the industry chalked up a 16 percent increase over 1947. Dollar value of pulp and paper exports for the first nine months totals $493,700,000.

# Michigan Superintendent's Nov. 18 Meet

KALAMAZOO—The Michigan Division of the American Pulp & Paper Mill Superintendents Ass'n., Inc., will hold its November 18 meeting at Hotel Harris. This meeting is dedicated to the "Old Timers" in the industry and allied trades. Invited for special honors are all the living ex-presidents of the national Association and the national officers.

Two films will be shown, one on "Logging Operations in Northern Minnesota" and the other entitled "Canadian Canoe Trails, 1948".

Allan B. Milham, former president of the Bryant Paper Co., and now a member of the Kalamazoo City Commission will act as toastmaster. D. C. Everest, president and general manager of the Marathon Corp., Rothschild; W. H. Brydges, president of the National Association in 1932-33, and Glen Sutton, superintendent of the Sutherland Paper Co., and fourth national vice-president, will have messages of special interest. Cocktails will be served at 5:30 p. m. Dinner at 6:30 p. m. Make reservations direct with Hotel Harris.

## $10,000,000 Debenture Sale

NEW YORK—Roy K. Ferguson, president of the St. Regis Paper Co., reports that the company has sold $10,000,000 of 15-year 3⅝ percent debentures at par, dated November 1, 1948, to the following: Metropolitan Life Insurance Co.; Prudential Insurance Co., of America; Penn Mutual Life Insurance Co.; Sun Life Assurance Co., of Canada; Aetna Life Insurance Co., and Mutual Life Insurance Co. of New York. Proceeds will be used in part for retirement of subsidiary company funded debt and to increase working capital. White, Weld & Co., were agents in this transaction.

## Tariff Slashes Spurred

WASHINGTON—Plans for tariff cuts with 11 countries after its program was strengthened by the elections were disclosed by the State Department on November 5.

Countries involved are Finland, Sweden, Denmark, Greece, Italy, Dominican Republic, El Salvador, Haiti, Nicaragua, Peru, and Uruguay. Negotiations will begin in Geneva next April 11. The U. S. Tariff Commission and the Committee on Reciprocity Information will hold hearings here on the projected pacts beginning December 7.

## Expanding, Modernizing

OREGON CITY, Ore.—Expansion and modernization of the Publishers' Paper Co. plant here (formerly Hawley Pulp & Paper Co.), major improvements and replacements are on the program, Carl Braun, vice-president and mill manager, declared on October 26.

Preparatory to replacing the present frame building at mill A, the company is spending about $150,000 in replacing an old timber dam beneath the building and revamping upstream construction over the grinder penstocks. Mr. Braun said the old mill A, one of the original structures of the pioneer paper plant, will be torn down and replaced by a concrete structure.

Installation of a pulp-drying plant has been completed and a new steam plant is planned, Braun stated. It will use hog fuel, oil or coal.

A concrete bulkhead and upstream betterments are planned above mill H to modernize and complete the dam around the east basin of Willamette Falls.

Henry Baldridge, head of the company's timber department, said adequate supplies are assured the pulp wood division with about 20 percent of the company's 60 million feet demand a year supplied from company-owned land on the coast. The balance is purchased in the valley and from loggers who truck white fir and hemlock to the Oregon City mill from Clackamas County operations.

## Green for Safety

VANCOUVER, B. C. — The 17th of March atmosphere will be present throughout November in the Powell River Co., Ltd., plant when safety committees start another all-out safety drive. As a publicity stunt, officials, union representatives, superintendents, and safety committee members are sporting eight-inch green bow ties while the drive is on. There is also a red tie motif in the picture, but safety officials hope it will not make its appearance. Should a department suffer a lost-time accident during the month, the superintendent of the department will change his green tie for a red one and will wear it for the balance of the month.

## Auction Brings $224,750

PROVIDENCE, Md. — The Jessup & Moore Paper Co., which was sold to the Osborne Paper Mill Corp., Fulton, N. Y., as reported in a previous issue of *Paper Trade Journal*, went to the new owner under the auctioneer's hammer at $224,750 on October 29. Of this sum, $175,000 bought the entire plant and approximately $50,000 was realized from the sale of 17 private homes on plant property.

## Monadnock Modernizing

NEW YORK — In keeping with modernization plans undertaken by the new ownership and management of the Monadnock Paper Mills, Inc., Frederick L. Smith, local paper mill engineer, will direct all work of design and engineering, it was disclosed on November 8.

The major work of installing an 88-inch trim Fourdrinier has been completed and this machine is now ready for full production. A General Electric turbo-generator has also been installed, steam for which will be furnished by a new Combustion Engineering Co. boiler to supplement the present installation of four boilers.

Stock preparation equipment, consisting of eight beaters, is being increased by the addition of a new 14-foot Dilts Hydropulper and a Jones Imperial Jordan. Vortraps are being installed on both these machines. A vapor absorption system, engineered by the J. O. Ross Engineering Co., is also well on the way to completion.

Many other major improvements have been made which will provide for a closer control of stock preparation and which will, when combined with the raw materials available, will enable Monadnock to manufacture high quality bonds, ledgers, covers, index, mimeograph, duplicating and specialty papers, both rag and sulphite.

The mill's sales department is the Pulp & Paper Trading Co., 21 East 40th street.

## Awarded Decoration

OTTAWA — Robert N. Harvey of the Anglo-Canadian Pulp & Paper Co. has been presented with the OBE in Quebec by the Lieutenant-Governor, Sir Eugene Fiset, for war services as director of contracts for chemicals and explosive products with the Canadian Government.

## Maine Firms Exhibit

PORTLAND, Maine—The Eastern Corp. of Bangor, and the Keyes Fibre Co. of Waterville, were among exhibitors in the Maine industrial exhibit at the recent Eastern States Exposition at Springfield, Mass.

## Service Award Dinner

ATTLEBORO, Mass. — American Reenforced Paper Co. executives and employes met in Taunton on October 16 for a silver anniversary dinner and first service awards to more than a score of long-time employes.

## Jersey Firm Incorporates

JERSEY CITY, N. J.—The United Paper Stock Corp., 880 Bergen avenue, has been incorporated by John N. Ellsworth, Miriam Chernetz and Rosanna Rubano, with capitalization of 1,000 shares of npv stock.

## Lindsay Heads P.A's.

VICTORIA, B. C. — G. M. Lindsay of the Sidney Roofing & Paper Co. has been elected initial president of the newly-formed Vancouver Island branch of the Purchasing Agents' Ass'n. of British Columbia.

## Rochford In New Post

BOSTON—William H. Rochford, formerly with Louis Dejonge & Co., has been appointed New England representative of Lachman & Novasel, New York, box paper jobbers.

## $16,000,000 Pulp Mill

EDMONTON, Alb.—R. O. Sweezey of Montreal, representing eastern financial interests has resumed discussions with provincial government authorities here regarding establishment of a $16,000,000 pulp and paper mill in the province, possibly in the Edmonton area.

Some weeks ago, officials of the provincial department of lands and mines said an application had been received from Mr. Sweezey for timber-cutting rights over a vast area. The application would be studied, particularly in relation to its probable effect on the timber reserves in Alberta.

## Rushmore Calls Men Back

GOUVERNEUR, N. Y.—Approximately 100 employes of the Rushmore Paper Mill Co. of Natural Dam, laid off temporarily, returned to work November 1. The lay-off resulted from a large surplus of jumbo rolls which forced the closing of paper machines. The surplus stock has been reduced and normal production activities are being resumed. Other divisions of the plant were not affected.

## Alaskan Log Delivery

BELLINGHAM, Wash.—The third crib of logs from Fitzgibbons Cove on Revillagigedo Island, Southeast Alaska, was delivered to the Puget Sound Pulp & Timber Co. in mid-October. It was mostly spruce. Carl Sahlin, timber purchaser for the company, said that additional deliveries are anticipated here over the 700-mile route.

## One Million 2-Year Olds

DUNCAN, B. C. — Sixty men are planting 1,000,000 two-year-old Douglas fir seedlings at Great Central Lake and on the old Hillcrest operations near this city under the direction of the provincial Forestry Service, according to the Hon. E. T. Kenney, British Columbia Minister of Lands and Forests.

## Relocating Oregon Mill

MILL CITY, Ore.—The Oregon Pulp & Paper Co. is moving its mill on Monument Peak to a location about one-half mile west of Gates. The mill closed down last fall and was resumed in the early summer under the management of Tony Ziebert.

## Install 137-Incher

ELIZABETH, N. J.—Peter Schweitzer, Inc., has installed a 137-inch paper making machine (its No. 10) for manufacturing cigarette paper. The machine is said by Wm. Schweitzer to be "the world's largest" of its kind.

## In Larger L. A. Quarters

LOS ANGELES—The local office and warehouse of the Dixie Cup Co. moved to larger quarters at 2600 East 12th street on November 1.

## Added to Sorg Staff

MIDDLETOWN, Ohio—Frank J. Hoffmann III has been added to the Sorg Paper Co. production staff.

## PACIFIC APPOINTEES

**Left—J. Youden, now machine room superintendent of the Ocean City, B. C., plant of Pacific Mills, Ltd. . . . Right—T. A. Goodridge, assistant superintendent. . . . Mr. Youden joined Pacific in 1919. He was made shift boss in 1942 and assistant superintendent of the paper machine room in 1945. . . . Mr. Goodridge joined the organization in 1926 as a beaterman. He was promoted to shift foreman in 1938.**

## Rhinelander Additions

RHINELANDER, Wis. — The Rhinelander Paper Co. has named Robert W. Reed to its technical staff as supervisor of fundamental research and new technical development problems, and John Tuttle as plant engineer. Mr. Tuttle will primarily be concerned with new mechanical development equipment installations and additions.

## Marathon Ups Three

MENASHA, Wis. — D. A. Snyder, director of sales for Marathon Corp., has been named vice-president in charge of sales; R. J. Sund has been named vice-president in charge of manufacturing; and F. J. Dvorak, assistant to the president has been added to Marathon's board of directors.

## Dixon Aiding VNS of N. Y.

NEW YORK—Willard J. Dixon, vice-president of the St. Regis Paper Co., is chairman of the Paper Division in the current campaign of the Visiting Nurse Service of New York to raise $425,000 for carrying on the free work of VNS during 1949.

## Doscher Boston Speaker

BOSTON—Fen K. Doscher, vice-president of the Lily-Tulip Cup Corp., was on the program as guest speaker before the Sales Managers Club at the first meeting of the season of that organization, held recently at the Hotel Copley-Plaza.

## Pollock Expanding

HOUSTON—The Pollock Paper & Box Co., has closed a 12-year lease, with 10-year option of renewal, of 150,000 square feet of floor space in the Feld-Reynolds warehouse at 501 Middle street.

## Huguley Launches Firm

OKLAHOMA CITY—The Huguley Paper & Box Co. has been launched by J. Rex Huguley, who recently resigned as vice-president of the Oklahoma Paper Co.

## Energetic Centenarian

BRUNSWICK, Maine — Henry Richards, former head of the Richards Paper Co., one of the earliest industrial enterprises in Gardiner, Maine, displayed an exhibit of his water colors at Bowdoin College in October. Mr. Richards held his first show on his 100th birthday, last July 17. He is the widower of Laura Richards, poet and writer of children's books, and the son-in-law of Julia Ward Howe, who wrote "The Battle Hymn of the Republic."

## New Tension Plant

SOUTH HACKENSACK, N. J. — The Tension Envelope Co. of Kansas City, Mo., headed by E. B. Berkowitz, has broken ground for a $500,000 plant in the Bergen County Industrial Terminal. When completed, the plant will take over activities and permit expansion of operations now carried on at 345 Hudson street, New York City.

## Rising Adopts Pension Plan

HOUSATONIC, Mass.—Walter E. Deverin, vice-president and treasurer of the Rising Paper Co., explained the provisions of the firm's recently inaugurated pension plan for employes at a dinner attended by some 200 members of the Rising personnel at Berkshire Inn, recently.

## Schwarz' 50th Year

LINCOLN, Neb. — The Schwarz Paper Co., jobber and converter of paper products, is celebrating its 50th anniversary. The firm was founded by C. F. Schwarz in 1899 and incorporated in 1901 by Mr. Schwarz, Harry Fletcher and T. F. McCarthy.

## Five-Fold Increase

PITTSFIELD, Mass.—A five-fold increase in output since May, 1945, is the production record of Henry Jarisch, Jr., Inc., local paper box firm, Alfred Jarisch, manager of the firm and nephew of the owner, reported on October 14.

## Seybold Expansion Begun

CINCINNATI — The Seybold Paper Co., has begun an expansion program to cover territory within a 50-mile radius, in addition to its present policy of supplying firms in Cincinnati, adjacent communities and northern Kentucky.

## Hubbell Succeeds Mulligan

CHICAGO — Mark Hubbell, Jr., has succeeded J. H. Mulligan as Container Corp. of America representative to the paper jobber trade in Michigan, Eastern Indiana, Western Ohio and Kentucky.

## Bachelor Quarters Open

VANCOUVER, B.C.—The Powell River Co., Ltd., officially opened Walnut Lodge on November 1. The lodge will house single male employes.

## Hertz to Arrow

NEW YORK—Harold L. Hertz joined the Arrow Paper Co. on November 1.

### Dupont Quartet Upped

WILMINGTON, Del. — Dr. Peter Van Wyck, manager of the Virginia Cellulose Division of the Hercules Powder Co. Experiment Station, has been appointed technical assistant to the Hercules director of research, to work on process development.

Dr. Richard E. Chaddock, who has been handling technical assistance in this field, now will take over responsibility for technical assistance on sales development and will serve as liaison between the sales development section of the department and the sales research division.

Dr. Arthur F. Martin will replace Dr. Van Wyck as manager of the Virginia Cellulose Division at the Experiment Station.

E. L. Jones, operating supervisor at the Hopewell plant, succeeds Dr. Martin as chief chemist of the plant.

### Fire Damage Trivial

OTTAWA—Alexander Fleck, Ltd., reports that newspaper accounts of a plant fire on October 28 were exaggerated. The damage was confined to a portion of the assembly shop and only minor interruption of operations and deliveries is being experienced. Alexander Fleck, Ltd., is Canadian associate of the Black-Clawson Co., Shartle Bros. Machine Co., and Dilts Machine Works.

### Gurley Appoints Lietz Co.

TROY, N. Y.—W. & L. E. Gurley, manufacturer of engineering and scientific instruments, has appointed the A. Lietz Co., with principal offices in Los Angeles and San Francisco, sales agent for Gurley equipment in California, Oregon, Nevada, Arizona, New Mexico, and El Paso, Texas, Lester C. Higbee, Gurley general sales manager, reports.

### H. M. Hooker Re-Elected

NEW YORK — H. M. Hooker, chairman of the board of the Hooker Electrochemical Co., was re-elected a board member of the National Industrial Conference Board for the forthcoming year on October 21. The Conference Board, founded in 1916, is an independent and non-profit institution for research and education in the fields of economics and business.

### Market Forge Names Rudy

NEW YORK—Robert P. Rudy has been appointed district manager of the New York area by the Market Forge Co., Materials Handling Division, Everett, Mass. His offices are in the Grand Central Terminal building.

### Ross Coast Office Moves

LOS ANGELES—The J. O. Ross Engineering Corp., has moved its local office to larger quarters in the new Westinghouse Building, 600 St. Paul avenue. R. W. Morsch continues in charge of the new Los Angeles office.

### Dorr Men On the Go

NEW YORK—T. Bartow Ford, manager of foreign sales of the Dorr Co., has left on a trip by air to Honolulu, Tokyo, Shanghai, Manila, Bombay and thence home by the middle of December, via Brussells and London.

Edmund B. Besselievre, engineer in charge of the company's sanitary engineering work in South America, has returned to that territory after a four-month visit here. He will make his headquarters for the immediate future in Sao Paulo, Brazil.

### Jessop Personnel Changes

WASHINGTON, Pa.—Frank B. Rackley has been made vice-president in charge of sales by the Jessup Steel Co., and Curtis A. Gordon, general works manager, has been made vice-president in charge of operations. E. E. Bradberry has been appointed assistant manager of sales in Chicago, with offices at 332 South Michigan Avenue.

### For Tasmanian Mills

VANCOUVER, B. C .— Canadian Sumner Iron Works Ltd. have shipped $400,000 worth of pulp mill machinery to Papermakers Proprietary, Ltd., Burnie, Tasmania. Norman Terry, sales manager, reports that his company is also filling a $100,000 order of similar equipment for Australian Newsprint Mills, Boyer, Tasmania.

### Monsanto Claim Settled

ST. LOUIS—Edgar M. Queeny, chairman of the board of the Monsanto Chemical Co. reports that his company's claims for loss resulting from the Texas City disaster have been settled for $17,312,000. "We are advised that this is the largest sum ever paid for a single loss," Mr. Queeny adds.

### Crowding Joins Huber

NEW YORK—F. Neil Crowding has joined the printing inks' sales department of the J. M. Huber Corp. He will cover Virginia, West Virginia, Delaware, Maryland, western Pennsylvania, and Washington, D. C.

### Kern Joins Patterson Co.

NEW YORK — Donald Q. Kern has joined the Process Engineering Division of the Patterson Foundry & Machine Co. in the R.K.O. building and has been appointed director of engineering of that division.

### Thomas Retires

PHILADELPHIA—Ray H. Anders succeeded Henry Thomas as director of purchases of the Sun Oil Co. Mr. Thomas will retire on December 1 after 36 years of service.

### Returning to U. S.

ROYAL OAK, Mich. — Clifford A. Laury of the Bagprint Machinery Corp., who has been in Europe since early October, embarked for the United States on November 6.

### Ross Increasing Facilities

VILLE LASALLE, Que. — Ross Engineering of Canada has started to construct a new $500,000 plant and office building here. It will be a one-story structure, 50,000 square feet in area, of steel, concrete block and brick. In its old plant in Verdun, Que., the company is making heating and ventilating equipment, including air systems for paper mills. This line, as well as others, will be expanded with completion of the new plant.

### Baxter-Stephenson

MIDDLETOWN, Ohio — J. R. Stephenson, formerly of Mechanicville, N. Y., is engaging in paper mill consulting engineering work here with B. M. Baxter, under the name of Baxter-Stephenson, Engineers.

### Community Relations Program

MINNEAPOLIS — The Minnesota & Ontario Paper Co. is embarking upon a broad, new program of community relations, J. E. Johnson, in charge of industrial relations, reports.

### Hoboken Plant Expansion

HOBOKEN, N. J.—Universal Folding Box Co., Inc., has completed a new 50,000-square-foot plant addition here, doubling its factory floor space for folding paper box manufacture.

### New Coin Wrapper

HAMILTON, Ont. — National Paper Goods Ltd., manufacturer of tubular coin wrappers, is exclusive Canadian distributor of Pakoin, a new "fool-proof" coin packer.

### Speeding Superior Addition

WATERLOO, Ont.—Superior Box Co. has the steel frame in place and walls going up for a 3,000-sq.ft., $55,000 addition expected to be completed by January 1.

### Col. Harkness Elected

OTTAWA—Col. R. Dickson Harkness, director of the Howard Smith Paper Mills of Canada, has been elected president of Northern Electric Co., Ltd.

### Another Reynolds Agent

LOUISVILLE, Ky. — The American Brass & Copper Co., Oakland, Calif., has been appointed a specialty distributor of Reynolds aluminum products.

### Bleach Plant Planned

RHINELANDER, Wis. — The Rhinelander Paper Co. has been granted a permit to erect an $85,000 bleach plant on West Davenport street.

### Resigns Utility Presidency

MONTREAL—Paul F. Sise, director of Howard Smith Paper Mills, has resigned as president of the Northern Electric Co., Ltd., of Canada.

# TRI-CLAD

REG. U.S. PAT. OFF.

## SPEED SYNCHRONOUS MOTORS AND GENERATORS

**These new synchronous motors and generators bring you the famous TRI-CLAD improvements:**

**Extra Protection Features!**—against physical damage—against electrical breakdown—against operating wear and tear.

**New Styling!**—smooth, rounded contours—baffled ventilating louvers—smooth-corners on exciters and conduit boxes.

Following General Electric design leadership, the new line of Tri-Clad synchronous motors and generators give you the same design features that made Tri-Clad motors so successful in more than a million and a half industrial applications.

Tri-Clad construction gives you protection where it counts. Frames and end shields with no openings above the center line—give protection against dripping liquids, falling objects, and accidental blows.

You get protection against electrical breakdown in normal operations. Proved insulating materials of the highest quality are used throughout. Small sizes (through frame 945) use Formex* wire for low voltage windings. Larger size coils are form wound and molded accurately to slot size.

Bearings are completely enclosed in cast iron with close running fits for long life with minimum maintenance. Deep oil reservoirs insure adequate lubrication with clean, cool oil.

You can get synchronous motors in the new Tri-Clad design in ratings from 20 hp to 1000 hp at 60 cycles, speeds from 514 to 1800 rpm. Synchronous generators are available from 12½ to 1250 kva. Direct connected exciters are available for any rating.

About ten years ago, the Tri-Clad design was introduced to combine the important features demanded by industry. Since then, it has been further improved with additional refinements—all of which have been incorporated in this new line of synchronous motors and generators.

For more information on how you will benefit from Tri-Clad construction in your synchronous motor and generator installations, contact your nearest G-E sales engineer. For detailed construction features, write for GEA-5113 (Motors) or GEA-5125 (Generators). *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

*Reg. U. S. Pat. Off.

Typical TRI-CLAD High Speed Generator with direct-connected exciter.

GENERAL ELECTRIC

770-1

## Safety Conference

TACOMA, Wash. — Representatives from the pulp and paper industry in the state of Washington met at Hotel Winthrop on October 28-29 for the third annual joint labor - management safety conference. Some 150 labor and management representatives from more than 20 Washington pulp and paper mills participated. They came from Anacortes, Bellingham, Camas, Everett, Hoquim, Longview, Port Angeles, Port Townsend, Shelton, Sumner and Tacoma.

Serving for the third time as co-chairmen of the conference were John Sherman, vice-president of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers, Tacoma, and O. R. Hartwig, general safety supervisor of Crown Zellerbach Corp., Portland.

Discussion leaders included Lawson Turcotte, executive vice-president of Puget Sound Pulp & Timber Co., Bellingham, and president of the Pacific Coast Ass'n. of Pulp & Paper Mfrs.; G. W. Charters, assistant resident manager of Crown Zellerbach at Camas; A. E. Brown, vice-president of the International Brotherhood of Paper Makers, and Oren Parker, international representative of the Brotherhood of Pulp, Sulphite and Paper Mill Workers.

Earl Anderson, director of the department of labor and industries, state of Washington, and Dan Adair, supervisor of the division of safety, department of labor and industries were speakers.

## "Perpetual Supply" Assured

TUSCALOOSA, Ala.—Nearing celebration of its 20th anniversary in Alabama, the Gulf States Paper Corp. has rounded out its program to promote a "perpetual supply" of pine for pulpwood in this area, Vance Miles, head of the firm's department of forestry, told Rotarians here on October 21. The firm has acquired considerable pine forest land and is putting into effective use modern practices designed to insure a perpetual crop. It has provided personnel and demonstration equipment for extension of its reforestation program to private pine-land owners who will avail themselves of this service.

## Carter Joins Faculty

UPPER DARBY, Pa.—Roy M. Carter, wood utilization specialist at the U. S. Forest Service's Northeastern Forest Experiment Station, left the Forest Service on November 1 to accept a position as professor of wood utilization in the Division of Forestry of North Carolina State College, Raleigh, N. C.

## Best CC Committeeman

John C. Best, vice-president of the National Gypsum Co., has been appointed chairman of the International affairs committee of the Buffalo Chamber of Commerce.

## Russian Paper Situation

NEW YORK—"Progress in rebuilding Russia's paper industry has been satisfactory, and in the first quarter of 1948, thirty-two percent more paper and 24 percent more paperboard were manufactured, according to an item in the German press," the American Pulp & Paper Ass'n., reports, translating from a story published in a Swedish pulpwood journal.

"During the war, about half of Russia's paper industry was destroyed. Due to the rapidity of the reconstruction work, mills which were still running at the war's end, have been able to reach prewar production. The Commissar for paper production has ordered continued reconstruction work for fifty-eight mills. In these mills, more than half the plants have been rebuilt, and it is believed that this modernization of facilities will bring about a greatly increased production. It is expected that by the end of the present five-year plan, namely 1950, Russia's paper production will be 60 per cent above the prewar figure." (Note: Russia's total paper and paperboard production in 1938 was 1,014,887 tons.)

"Although the article in the German press does not definitely state so, it is believed that the 60 percent increase in production applies to 'old' Russian, and does not include the areas which have been annexed more or less after the war; namely the bordering Baltic states, East Poland, and the Konigsberg section."

## New Constitution

BUFFALO, N. Y.—The United Paperworkers (CIO) on October 20 unanimously adopted resolutions condemning "un-Americanism" and a constitution designed to bar disloyal persons from holding any office or job in the union.

The constitution states:

"The United Paperworkers of America condemns Communists, Nazis, Fascists and all other political parties, groups and philosophies that advocate the destruction of the democratic form of government and the establishment of dictatorship.

"Only those who subscribe to the democratic form of government shall be eligible for positions as officers, representatives or agents of the United Paperworkers or its subdivisions."

## Seek Truck Rate Boost

BOSTON — Motor Carriers in New England will ask the Interstate Commerce Commission for an increase of "at least 25 per cent" in freight rates and an immediate interim rate boost of about ten percent, paper manufacturers in the six-state area were informed on Oct. 29. The New England Motor Rate Bureau said it plans very soon to file these demands, as well as a request for minimum rates in all classes. ICC hearings will take some time, the Bureau said.

## Canadian Wages Climbing

OTTAWA—The Employment and Payrolls Branch of the Canadian Government reports that its latest nation-wide survey shows the average hourly earnings in the pulp and paper products manufacturing industry increased to 103.7 cents on August 1 this year, compared with 91.5 cents on the same date a year ago and 102.9 cents on July 1 this year, with the average weekly wages in this industry rising to $47.29 on Aug. 1 as against $42.18 on the same date last year or $46.92 on July 1 this year.

This official report also discloses that the average hourly earnings in the pulp and paper manufacturing industry had risen three cents on August 1 as against 99.5 cents on August a year ago or 110.2 on July 1 this year, with the average weekly wages on August 1 this year amounting to $54.83 as against $49.75 a year ago on the same date and $54.44 on July 1 this year.

Average hourly earnings in the paper products manufacturing industry of Canada reached 81.7 cents at August 1, against 70.7 cents on August 1 of last year, or 80.8 cents on July 1 this year, and the average weekly wages in this industry climbed up to $34.80 on August, compared with $30.12 on August 1 last year, or $34.50 on July 1 this year.

## More Workers In Jobs

WASHINGTON—Increases in employment in the paper and pulp industries kept ahead of discharges, lay-offs, and other curtailments during August and July, the Bureau of Labor Statistics reported this week. Increases were at the rate of 3.2 per 100 employees in August, and 3.3 per 100 in July, compared with a discharge rate of .3 and lay-offs in the same ratio, during both months. Employment in the paper box industry rose 6.2 per 100 workers in August and 5.1 in July, compared with an August discharge rate of .5 and July rate of .4, and a lay-off rate of .3 per 100 workers in both months.

## At Spring, '48 Sessions

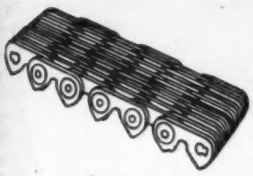
The paper entitled "Role of Industrial Engineering in the Paper Industry" which was published in the September 30 issue of *Paper Trade Journal* was delivered by the author, A. W. Holloway of the engineering department of the Pacific Mills, Ltd., Ocean Falls, B. C., Canada, at the Spring, 1948, Sessions of the Pacific Coast Branch, Technical Section, Canadian Paper and Pulp Ass'n., at Ocean Falls. Through inadvertance, mention of the date and place of original delivery of Mr. Holloway's paper was omitted when the paper was printed.

## Sensenbrenner Incorporate

MILWAUKEE—F. James Sensenbrenner and his father, Col. John S. Sensenbrenner, have formed the Sensenbrenner Paper Co., for the distribution of fine papers.

# The Right Chain for Every Use in Power Transmission and Materials Handling

## . . . . by LINK-BELT



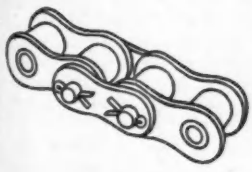
Silverstreak Silent Chain

The wide variety of chain types and the wide range of sizes, enable Link-Belt to offer industry the right chain for every use in power transmission and materials handling.

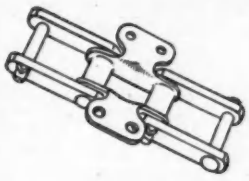
As pioneer and leader in the field of chain design and manufacture, Link-Belt invites you to use our engineering facilities. Our advice based upon broad and long experience is always available to you.

**LINK-BELT COMPANY,** 11,178-J

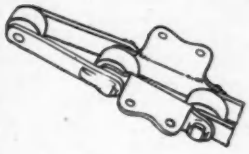
Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices, Factory Branch Stores and Distributors in Principal Cities.



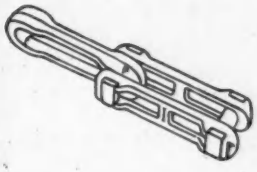
Silverlink Roller Chain



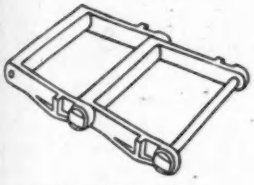
"C" Combination Chain



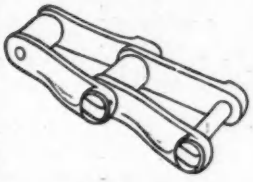
"1100" Roller Chain



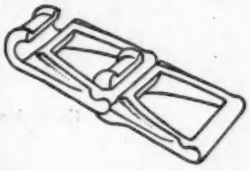
Rivetless Steel Conveyor Chain



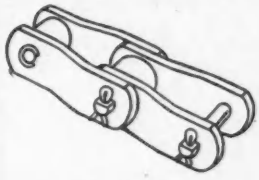
"H" Refuse Chain



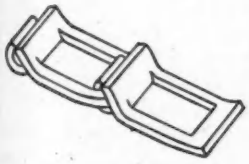
"H" Pintle Chain



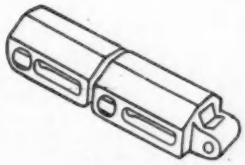
Ewart Detachable Link-Belt



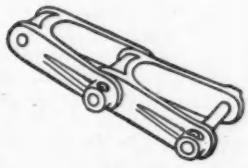
"SS" Steel Roller Chain



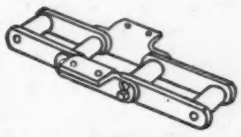
Steel Link-Belt



Transfer Conveyor Chain

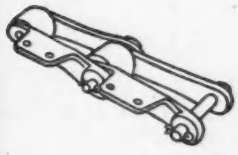


"800" Steel Chain



"SS" Steel Chain

## Chain. . by LINK-BELT



"MR" Roller Chain

# Trends

Office of the PAPER TRADE JOURNAL,
Wednesday, November 10, 1948

### Wood Pulp

Although trading in European wood pulp is reported to have received small stimulus from fourth quarter price reductions, the Department of Commerce reports increased consumption of the domestic product, stimulated by the trend toward prewar standards of higher quality.

"The relative increase in the ratio of pulp to product has taken place largely in paperboard mills which used nearly 14 percent more pulp in August than in March yet produced 5 percent less paperboard," writes W. LeRoy Neubrech of the Department. "For paper mills, pulp consumption was nearly 3 percent less and paper production 2 percent down in like comparison. There also was a large increase in pulp usage, as well as output of products, by building board mills. These broad comparisons indicate the trends of the past 12 months toward the production of higher quality products in many items, and a decline in the use of the secondary fiber, particularly waste paper. In fact, waste paper consumption in August was 14 percent less than in March this year, with paperboard mills using about 13 percent less, and paper and building board mills 17½ percent less. The trend toward increased and sustained production in the large mass-producing integrated pulp and paper or board companies, with a comparable leveling or falling off in output of nonintegrated paper or board mills is strikingly disclosed by reference to data on pulp consumption by type of mill. Whereas all paper and board mills consumed 12 percent more pulp in August this year than in August 1947, mills using their own integrated pulp consumed nearly 15 percent more pulp, while mills not integrated with their own pulp showed practically no change in their consumption of purchased pulp. Comparing August with March of this year, all mills used 4 percent more pulp, while integrated mills used 6 percent more and nonintegrated mills about 6 percent less. . . . Principal gains in pulp consumption in paper and board production have been in sulphate grades. In August this year, the industry used 18 percent more than in August 1947 and 8 percent more than in March 1948. Integrated mills used nearly 22 percent more sulphate than in August 1947, while nonintegrated mills used nearly 22 percent more sulphate than in August 1947, while nonintegrated mills consumed 6½ percent less of purchased sulphate pulp. Comparing August 1948 with March 1948, integrated mills used 11½ percent more sulphate pulp, while nonintegrated mills consumed 20 percent less."

### Finnish Pulp

Commenting on reduction in European pulp prices which the Finns felt obliged to parallel despite their domestic problems, the Dept. of Commerce states that "The most significant development in Finnish wood pulp affairs during 1948 was the action of the U.S.S.R. in absolving Finland of further obligation to deliver pulp and paper on account of reparations until the end of 1952." (Also, it is learned that the remaining unpaid reparations to Russia were reduced one-half.) "The effect of this action on the availability of Finnish pulp is apparent," continues the Department's report, "when it is considered that Russia during 1947 received nearly 170,000 short tons of reparations pulp from Finland. Although the recent demand for her wood pulp has slackened in consequence of the cancellation of contracts by hard currency countries, the world demand is expected eventually to take all the pulp that Finland can offer, particularly of the chemical grades. Her mechanical pulp on the other hand is reported to have encountered some competitive difficulties in world markets. The recent consummation of a one-year trade agreement with the Russian zone of Germany calls chiefly for deliveries of Finnish chemical pulp as well as paper. U. S. imports of Finnish pulp during the first eight months of the current year totaled 152,000 tons, approximately 17,000 tons more than in the same period of 1947," (September imports dropped to 3341 tons.)

It is learned from Washington that the Export - Import Bank has loaned Finland $10,000,000 to boost production of pulp and paper and other wood products, repayment to be made by January 1, 1949, at 3½ percent interest.

### Canadian Product

U. S. mill receipts of Canadian market pulp are reported to show moderate gains over 1947, reflecting the development of new pulp-making facilities, the greatest proportionate increase being in sulphate grades. Enlargement of Bowater's Newfoundland mill is expected to provide small quantities of sulphite pulp to U. S. mills. It is learned that this is already under contract.

### U. S. Market

The domestic market is described as inactive. Inventories are still considered ample, and little trading above immediate needs can be stimulated. "Mill inventories continue at a high level," reports the Dept. of Commerce, "with the national total of 583,000 tons at the close of August being sufficient for approximately 67 days operations." Rumors that further drops in Scandinavian prices must come find little support among importers here. Some feel the market is steadying, especially with the immediate prospect of a prolonged tie-up of Atlantic shipping to be considered. Distress sales are said to have dropped to a minimum. "Trade reports in respect to the market pulp supply position also contain a more conservative note, as some prominent executives discount the possibility of any considerable easing in the availability of purchasable pulp or in its general price levels throughout the forthcoming year," concludes the Department.

### Waste Paper

The market for waste paper continues to be featured by an over-supply of most grades. And with adequate supplies of pulp available, substitute grades reflect a further softening in prices. Trading is generally reported as dull, although some houses indicate a steady though somewhat restricted demand from old customers. "The consumption of waste paper continues throughout the nation on an extremely high level," says the E.C.C. "The mills of the East today are buying and consuming more waste paper than during any previous year in their history except last year. Consumption this year is down only about 1 percent from the record-breaking consumption of 1947. But there has been a change in the situation in New York. The change was brought about partly by the tremendous increase in freight rates. Until the increased freight rates made it economically unsound for mills in distant parts of the country to buy mixed waste paper in the New York market, many thousands of tons were purchased here and shipped to mills as far away as Louisiana. In recent months, we have heard of none going out of the local territory except a relatively small amount shipped overseas."

Mill buying for inventory began during the week of October 18, chief purchases being the news grades.

### Indexes

Index of general business activity for the week ended October 30 rose to 154 from 151.2 in the preceding week, compared with 147.3 in the corresponding week of 1947.

Index of paperboard production climbed to 185.2 from 176.9 in the preceding week, compared with 174.0 in the corresponding week of 1947.

Comparative ratios of U. S. paper and paperboard production to mill capacity as reported by AP&PA are:

| | Oct. 30 1948 | Oct. 23 1948 | Nov. 1 1947 | Nov. 2 1946 | Nov. 3 1945 |
|---|---|---|---|---|---|
| Paper** ..... | 100.2 | †98.7 | 111.1 | 107.2 | 97.5 |
| Paperboard .... | 96.0 | 95.0 | 100.0 | 100.0 | 97.0 |

**Indicates 1948 volume of 180,541 tons. Comparable week, 1947, 176,075 tons.
†Revised.

### Paperboard Production (Tons)

| | Oct. 30 1948 | Oct. 23 1948 | Nov. 1 1947 | Month of Oct. 4 weeks |
|---|---|---|---|---|
| Production ... | 193,819 | 189,737 | 182,029 | 768,435 |
| New Orders .. | 199,563 | 161,905 | 192,927 | 761,369 |
| Unfilled Orders | 365,928 | 359,739 | 436,178 | 365,928 |

Percent of Activity, Current 96%; Year 96%.

# Don't wake him up...

## he's dreaming that all his equipment is made of Stainless Steel

● Here's one mill superintendent who is really happy—even if it's only in his sleep.

Let him dream on. Don't disturb his visions of how wonderful things would be with Stainless Steel to put new life into his equipment, to arrest corrosion, prevent contamination, to reduce shut-downs for repairs and replacement.

That Stainless Steel will accomplish these highly desirable results is beyond question. Stainless Steel has been used in pulp and paper mills long enough and in enough different places to have thoroughly justified the favored place it holds today.

For example, in sulfite digesting equipment, in vacuum stills, heat exchangers, and in pipes and fittings handling hot sulfite liquors, the longer service Stainless assures is a matter of record.

In cylinder molds, Stainless Steel winding wire and screen cloths will last years instead of weeks.

The discoloration and contamination that occurs when beater bars and Jordan fillings are made of ordinary steel disappear when Stainless is used.

Smooth, easily cleaned Stainless reduces the weight of Fourdrinier save-all pans, makes them easier to handle, avoids the collection of stock, slime and filler.

Why not make *your* dreams come true? Our engineers who are experts on Stainless have been helping to apply it in mills for many years. Ask for their help in determining what type of U·S·S Stainless will do the best, most efficient job for you. Simply outline your problems and write to United States Steel Subsidiaries, Room 2043 Carnegie Building, Pittsburgh, Pennsylvania.

AMERICAN STEEL & WIRE COMPANY
GENERAL OFFICES: CLEVELAND, OHIO
CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
NATIONAL TUBE COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST TO COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

**U·S·S STAINLESS STEEL**

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

8-1160

UNITED STATES STEEL

# Imports

Week Ending Nov. 6

## NEW YORK

### Newsprint

Post Corp., Ogna, Rouen, 731 rolls.
R. A. Olsen, Donpaco, Donnacona, 371 rolls.
Montmorency Paper Co., Storfjell, Botwood, 3709 rolls.
R. A. Olsen, Kermic, Donnacona, 380 rolls.
H. G. Craig Newscarrier, Donnacona, 346 rolls.
R. A. Olsen, A.C.D., Donnacona, 381 rolls.
Intercontinental Commercial Paper Corp., Lisieux, Antwerp, 689 rolls.
News Syndicate Co., Ethel Tombs, Gatineau, 280 rolls.
Pagel Horton & Co. Inc., Stavangerfjord, Oslo, 257 rolls.
Madden Reeve Angel & Co., Inc., Tunaholm, Gefle, 1504 rolls; Kotka, 1750 rolls.
Malmar Paper Co., Exchequer, Trieste, 38 rolls.
News Syndicate Co., Samtruth, Baie Comeau, 3688 rolls.
Post Corp., Molda, Rouen, 218 rolls.
(———), Molda, Rouen, 588 rolls.
R. A. Olsen, A.C.D., Donnacona, 377 rolls.
(———), Donpaco, Donnacona, 351 rolls.
R. A. Olsen, G.D.D., Donnacona, 388 rolls.

### Drawing Paper

Dingelstedt & Co., American Farmer, Bremen, 32 crates.
W. C. Sullivan & Co., American Farmer, Bremen, 64 crates.
H. Reeve Angel & Co., Inc., American Farmer, London, 10 cs.

### Tracing Paper

Agency Paper Co., American Farmer, Bremen, 1 pkge.
E. Dietzgen & Co., American Farmer, Bremen, 1 pkge.

### Tracing Cloth

Keuffel & Esser Co., American Builder, Manchester, 12 cs. (cotton).

### Paperhangings

W.H.S. Lloyd & Co., American Farmer, London, 27 bls. 9 cs.

### Filter Paper

H. Reeve Angel & Co., Inc., American Farmer, London, 14 cs.

### Wall Paper

Hudson Shipping Co., American Farmer, London, 1 cs.

### Serviettes

H. W. Robinson & Co., American Farmer, London, 9 cs.

### Wallboard

Pretexol Corp., Stavangerfjord, Oslo, 1 bdl.
Elof Hansson, Inc., Gripsholm, Gothenburg, 1 cs.

### Tissue Paper

B. F. Drakenfeld & Co., American Builder, Liverpool, 6 cs.

### Miscellaneous Paper

Public National Bank Trust Co., Gripsholm, Gothenburg, 65 rolls.
(———), Avordyk, Rotterdam, 775 pkgs

### Rags, Baggings, Etc.

Chase National Bank, Mohamed El Kebir, Alexandria, 67 bls. white cotton rags.
Chemical Bank Trust Co., Mohamed El Kebir, Alexandria, 96 bls. Hessian bagging, 71 bls. old cotton rags.
Bank of N. Y. Trust Co., Mohamed El Kebir, Alexandria, 83 bls. white cotton rags.
National City Bank, Mohamed El Kebir, Alexandria, 49 bls. old scrap bagging, 63 bls. old bagging, 68 bls. old jute bagging.
J. P. Fleisig, T. J. Stevenson, Genoa, 232 bls. dark cottons.
Midwest Waste Material Co., Molda, Antwerp, 61 bls. waste cuttings.
Ledeboer & Co., Molda, Havre, 34 bls. cotton waste.
A. de Vries Trading Corp., Leerdam, Antwerp, 86 bls. paperstock.
Loumar Textile By-Products, Exporter, Venice, 229 bls. rags.
(———), Excelsior, Leghorn, 46 bls. new cuttings.
National City Bank, Excelsior, Genoa, 67 bls. old bagging.
E. J. Keller Co., Inc., Norwalk Victory, Antwerp, 113 bls. old bagging, 78 bls. rags.
J. J. Rozendaal, Norwalk Victory, Antwerp, 187 bls. cotton waste.
Irving Trust Co., Jessie Maersk, Rouen, 69 bls. bagging.
Midwest Waste Material Co., Jessie Maersk, Rouen, 67 bls. scrap bagging.
Irving Trust Co., Tunaholm, Malmo, 131 bls. jute rags.
Loumar Textile By-Products, Kristina Thorden, Gothenburg, 59 bls. old bagging.
Midwest Waste Material Co., Lisieux, Antwerp, 69 bls. scrap bagging.
Irving Trust Co., Lisieux, Antwerp, 84 bls. old bagging.
Bank of The Manhattan Co., Lisieux, Antwerp, 79 bls. bagging.

### Old Rope

(———), Excelsior, Calcutta, 65 bls. old hemp rope cuttings.

### Casein

American Cyanamid Co., Argentina, Buenos Aires, 4300 bags.

### China Clay

United Clay Mines Co., Wells City, Avonmouth, 42 tons, 10 cwt.

### Hidecuttings

(———), Cape Avinof, Barranquilla, 166 pkgs.

### Woodpulp

Perkins Goodwin & Co., Gripsholm, Gothenburg, 1 pcl. (samples).

### Woodpulp Board

Jay Madden Corp., Tunaholm, Kotka, 363 rolls (solid white).

## BOSTON

International Purchasing Co., Norwalk Victory, Antwerp, 63 coils old rope.
1st National Bank of Boston, Exchequer, Bari, 738 bls. old cotton rags.

## PHILADELPHIA

Chemical Bank Trust Co., Exporter, Venice, 163 bls. rags.
Drueding Bros., Exporter, Genoa, 6 cs. tissue paper caps.
Chemical Bank Trust Co., Excelsior, Leghorn, 51 bls. rags.
National Casein Sales Co., Fenris, Buenos Aires, 1016 bags casein.
Scott Paper Co. (Chester, Pa.), Samtruth, Baie Comeau, 13360 bls. unbleached sulphite pulp.
E. J. Keller Co., Inc., Norwalk Victory, Antwerp, 63 bls. old bagging.
J. H. Weil & Co., American Builder, Manchester, 8 cs. cotton tracing cloth.

## BALTIMORE

Railway Supply & Manufacturing Co., T. J. Stevenson, Havre, 47 bls. jute waste.
Chemical Bank Trust Co., Tunaholm, Halmstad, 2500 bls. dry sulphite pulp.
Brown Bros., Harriman & Co., Tunaholm, Halmstad, 1250 bls. dry sulphite pulp.
Bulkley Dunton Co., Tunaholm, Norrkoping, 712 bls. dry sulphite pulp.
Perkins Goodwin & Co., Tunaholm, Norrsundet, 750 bls. dry sulphate pulp.
Cellulose Sales Co., Tunaholm, Svartvik, 4150 bls. dry sulphite pulp.

## NORFOLK

(———), Kristina Thorden, Gothenburg, 26 bls. tares.

## Canadian Price Indexes

OTTAWA, Can. — Wholesale price indexes of newsprint and wrapping papers stood at 134.8 in Sept. this year, compared with 123.6 in Sept. 1947, the Prices branch of the Canadian Government reports. Prices of pulp stand at 195.8 in Sept. against 190.8 in the corresponding month last year. (Base of 1926 equals 100.)

## Diamond Chlorine Upped

CLEVELAND—Diamond Alkali Co. announced an increase in *delivered* prices of 100- and 150-pound cylinders of chlorine effective November 1. New prices include return freight charges on empty cylinders. Shipments will be made from and empties returned to Diamond's plants at Painesville, Ohio, and Houston, Tex. Recent increases in freight rates and rising production costs made the increases necessary, the company stated. Diamond's chlorine pricelist, by states, follows:

| | | | |
|---|---|---|---|
| Ala. | $11.50 | N. C. | 11.50 |
| Ariz. | 15.00 | Neb. | 12.25 |
| Ark. | 10.75 | Nev. | 18.50 |
| Conn. | 11.00 | N. H. | 11.25 |
| Del. | 10.75 | N. J. | 10.75 |
| D. C. | 10.75 | N. M. | 12.25 |
| Fla. | 14.25 | N. Y. | 10.25 |
| Ga. | 12.50 | N. D. | 13.50 |
| Ida. | 19.00 | Ohio | 10.25 |
| Ill. | 10.75 | Okla. | 11.00 |
| Ind. | 10.50 | Pa. | 10.50 |
| Iowa | 11.75 | R. I. | 11.00 |
| Kan. | 12.00 | S. C. | 12.50 |
| Ky. | 11.00 | S. D. | 13.00 |
| La. | 10.25 | Tenn. | 10.75 |
| Me. | 12.00 | E. Tex. | 10.25 |
| Md. | 10.75 | W. Tex. | 10.75 |
| Mass. | 11.00 | Utah | 16.00 |
| Mich. | 10.25 | Vt. | 11.25 |
| Minn. | 12.00 | Va. | 11.25 |
| Miss. | 10.50 | W. Va. | 10.25 |
| Mo. | 11.25 | Wis. | 11.25 |
| Mont. | 18.25 | | |

## Baker Addresses NACM

BUFFALO, N. Y. — Melvin H. Baker, president of the National Gypsum Co., addressed the annual tri-state conference of the National Association of Credit Men in Hotel Statler recently.

## Martin Joins Wolf-Detroit

DETROIT — Victor Martin is now associated with the Wolf-Detroit Envelope Co. Previously he was vice-president of the Champion Envelope Mfg. Co., of New York.

## H. & D. Richmond, Va., Plant

RICHMOND, Va. — The Hinde & Dauch Paper Co. has purchased a site here for construction of a corrugated box factory scheduled to be completed in the fall of 1949.

# Prices

**Quotations indicate trends in an open market. At the moment they can be of little more value. While some volume business still is done under contract at the figures shown, fluctuations are too varied and frequent to permit prices to be interpreted as representing a wholly stabilized market.**

## NEW YORK

### Paper

(Delivered New York)

Standard News, per ton—
Rolls, contract ..... $100.00/ —
Sheets ..... 115.00/ —

Kraft—per cwt.—Carload Quantities Zone A
Deld. 40 lb. base wgt.
Superstandard Wrapping ..... $9.00/ —
No. 1 Wrapping ..... 7.75/ 8.00
Standard Wrapping Rolls ..... 7.00/ —
Standard Wrapping Sheets ..... 7.50/ —
Standard Bag ..... 6.50/ —

Tissues—Per Ream 24x36 (480) 10/11 lbs. Zone 1.
Wh. No. 1 Frd. ..... $1.84/$2.00
Wh. No. 1 M. G. ..... 1.94/ 2.00
Wh. No. 1½ ..... 1.65/ —
Wh. No. 2 ..... 1.50/ 1.70
Kraft Anti-Tar ..... 1.65/ —
Kraft Unbl. ..... 1.85/ —
Shred. Wh. No. 1 per lb. ..... .12¾/ .18

Toilet—Per Case of 100 rolls—1 M Sheets.
Unbleached ..... $7.50/$10.00
Bleached ..... 8.75/ 10.00

Paper Towels—Per Case of 3750—Zone 1.
Wh. Jr. M'tif'd 9¼x9½ ..... $5.45
Br. Sr. M'tif'd 10x12 ..... 3.80
Br. Jr. M'tif'd 9½x9¾ ..... 3.30
Br. Jr. Sgl. fold 10x10¾ ..... 3.35

Manila—per cwt.—C-1 f.a.
No. 1 Jute Tag ..... $14.50/ —
Reg. Jute Manila ..... 13.25/$15.50
No. 1 Manila Wrapping ..... 8.75/ 10.50
5 lb. Manila ..... 10.75/ 11.25

Boards, per ton—
Filled News ..... 94.00/
Plain Chip ..... 85.00/ 90.00
Bkbd. Mla. L-d. Chip* ..... 105.00/
White Pat. coated* ..... 120.00/
Kraft Liners 42 lb. ..... 105.00/
Kraft Corr. .009 ..... 110.00/*
Binders Boards ..... 126.00/
* Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following prices are representative of distributors' resale prices, all deliveries in Zone 1:

Rag Content Bonds and Ledgers—

White, 16 lb.
Bonds, per cwt.

| | Carton | 4 C't'n | Ton |
|---|---|---|---|
| 100% Rag Ext. No. 1 | $59.00 | $54.55 | $52.30 |
| 100% Rag | 52.25 | 48.30 | 46.30 |
| 75% Rag | 41.50 | 38.30 | 36.70 |
| 50% Rag | 33.75 | 30.70 | 29.50 |
| 25% Rag | 30.25 | 27.45 | 26.35 |

Ledgers, per cwt.

| | | | |
|---|---|---|---|
| 100% Rag Ext. No. 1 | $57.00 | $52.65 | $50.50 |
| 100% Rag | 50.25 | 46.40 | 44.50 |
| 75% Rag | 41.50 | 38.30 | 36.70 |
| 50% Rag | 33.75 | 30.70 | 29.50 |
| 25% Rag | 30.25 | 27.45 | 26.35 |

Sulphite Bonds and Ledgers—
White, 16 lbs.
Bonds, per cwt.

| | | | |
|---|---|---|---|
| No. 1 | $21.25 | $19.25 | $18.50 |
| No. 2 | 20.25 | 18.30 | 17.55 |
| No. 4 | 19.25 | 17.55 | 16.85 |

Ledgers, per cwt.

| | | | |
|---|---|---|---|
| No. 1 | $21.75 | $19.65 | $18.85 |
| No. 2 | 20.75 | 18.75 | 18.05 |
| No. 4 | 20.00 | 18.10 | 17.35 |

White Book, per cwt.—
Coated

| | Case | Ton |
|---|---|---|
| No. 1 Glossy | $20.90 | $20.15 |
| No. 2 Glossy | 19.65 | 18.90 |
| No. 3 Glossy | 18.90 | 18.25 |
| Machine Coated | 16.65 to 17.15 | 16.05 to 16.35 |
| Uncoated | | |
| No. 1 Antique (Watermarked) | 16.40 | 15.80 |
| Offset | 15.15 to 17.15 | 14.60 to 16.40 |
| A Grade E. F. | 15.40 | 14.85 |
| A Grade S. C. | 15.90 | 15.35 |
| B Grade E. F. | 15.15 | 14.55 |
| B Grade S. C. | 15.65 | 14.95 |

### Wood Pulp

Fourth Quarter

Domestic mill contract prices delivered with varying freight allowances.

| | Per Short ADT |
|---|---|
| Groundwood | $80.00/ $81.00 |
| Unbleached Sulphite | 124.00/ — |
| Bleached Sulphite | 125.00/ 135.00 |
| Bleached Soda | 130.00/ 135.00 |
| Bleached Sulphate | 155.00/ 165.00 |
| Unbleached Sulphate Northern | 120.00/ 130.00 |
| Unbleached Sulphate Southern | 110.00/ 125.00 |

### Canadian Quotations

Prices delivered with varying freight allowances unless otherwise specified:

| | Per Short ADT |
|---|---|
| Bleached Sulphate | $150.00/$160.00 |
| Unbleached Sulphate | 125.00/ 135.00 |
| Unbleached Sulphite | 125.00/ 126.00 |
| Bleached Sulphite | 125.00/ 135.00 |
| Glassine Unbleached Sulphite (no freight allowance) | 120.00/ — |
| Bleached Soda | 130.00/ — |
| Groundwood | 80.00/ 85.00 |
| Sideruns Pulping News | 80.00/ 90.00 |

### Swedish Quotations

On dock, Atlantic Ports

| | Per Short ADT |
|---|---|
| Bleached Kraft | $165.00/ — |
| Bleached Sulphite | 165.00/ — |
| Unbleached Sulphite | 140.00/ 149.00 |
| Unbleached Kraft | 127.50/ — |

### Finnish Quotations

On dock, Atlantic Ports

| | Per Short ADT |
|---|---|
| Bleached Sulphite | $165.00/ — |
| Unbleached Sulphite | 140.00/ 143.00 |
| Unbleached Sulphate | 127.50/ — |

### Norwegian Quotations

On dock, Atlantic Ports

| | Per Short ADT |
|---|---|
| Bleached Sulphite | $165.00/$175.00 |

### New Domestic Cotton Cuttings

(F.o.b. Ship. Pt. Plus Dealer's Commission)

| | | |
|---|---|---|
| White Shirt | $10.50/ | $11.00 |
| Unbleached Muslin | 11.00/ | 11.50 |
| Light Silesias | 8.50/ | 8.75 |
| White Back Blue Overalls | 8.50/ | 8.75 |
| Blue Overalls | 7.50/ | 8.00 |
| Fancy Shirt | 6.25/ | 6.75 |
| Percales | 7.00/ | 7.25 |
| Light Prints | 7.50/ | 7.75 |
| No. 1 Washables | 5.00/ | 5.25 |
| Bleachable Khaki | 7.00/ | 7.50 |
| Unbleachable Khaki | 6.00/ | 6.50 |
| Cottonades | 5.50/ | 5.75 |
| Lt. Flannelettes | 8.50/ | 8.75 |
| Men's Corduroy | 5.50/ | 6.00 |
| Women's Corduroy | 5.25/ | 5.75 |

### Old Domestic Cotton Rags

(F.o.b. Ship. Pt. Plus Dealer's Commission)

| | Per 100 lbs. | |
|---|---|---|
| No. 1 Whites, Repacked | $4.00/ | $4.50 |
| No. 1 Whites Miscellaneous | 3.50/ | 4.00 |
| No. 2 Whites Repacked | 3.25/ | 3.50 |
| No. 2 Whites Miscellaneous | 2.75/ | 3.00 |
| Blue Overalls | 3.75/ | 4.00 |
| Thirds and Blues Repacked | 2.50/ | 2.75 |
| No. 1 Roofing Rags | 1.45/ | 1.55 |
| No. 2 Roofing Rags | 1.35/ | 1.45 |
| No. 3 Jute Bagging | 1.25/ | 1.35 |
| No. 4 Brussels & hrd. bck'd crpts. | 1.25/ | 1.35 |
| No. 5A Roofing Rags | 1.25/ | 1.35 |

### New Foreign Cotton Cuttings

(Prices to Mill, F.o.b. Dock, N. Y.)

| | Per 100 lbs. | |
|---|---|---|
| New Dark Cuttings | $5.50/ | $5.75 |
| New Mixed Cuttings | 6.25/ | 6.50 |
| Light Silesias | 9.25/ | 9.50 |
| Light Flannelettes | 9.25/ | 9.50 |
| New White Cuttings | 12.00/ | 13.00 |
| New Unbleached Cuttings | 12.25/ | 13.00 |
| Fancy Shirt Cuttings | 6.50/ | 7.00 |
| Light Prints | 7.75/ | 8.00 |
| Bleachable Khaki, No. 1 | 7.00/ | 7.50 |
| Unbl. Khaki, No. 1 | 6.25/ | 6.75 |

### Old Foreign Rags

(Prices to Mill, F.o.b. Dock, N. Y.)

| | Per 100 lbs. | |
|---|---|---|
| No. 1 White Cottons | — / | — |
| No. 2 White Cottons | — / | — |
| No. 3 White Cottons | — / | — |
| No. 4 White Cottons | 3.75/ | 4.00 |
| Extra Light Prints | 6.50/ | 7.00 |
| Old Light Prints | 4.50/ | 5.00 |
| Med. Light Prints | 4.00/ | 4.50 |
| Dutch Blue Cottons | 5.25/ | 5.50 |
| Checks and Blues | 4.00/ | 4.25 |
| Linsey Garments | 1.75/ | 2.00 |
| Dark Cottons, European | 1.65/ | 1.75 |
| Dark Cottons, Egyptian | 1.55/ | 1.65 |
| Old Shopperies | nominal | |
| New Shopperies | nominal | |

### Bagging

(Prices to Mill, f.o.b. N. Y.)

| | Per 100 lbs. | |
|---|---|---|
| Foreign Gunny, No. 1 | $7.50/ | $8.50 |
| Domestic Gunny, No. 1 | 7.50/ | 8.50 |
| Heavy Wool Tares | 7.50/ | 7.75 |
| No. 1 Scrap Baggins | 7.00/ | 7.25 |
| Roofing Bagging | 1.10/ | 1.20 |
| Foreign Manila Rope | 5.50/ | 5.75 |
| Domestic Manila Rope | 6.00/ | 6.25 |
| Jute Strings | 7.00/ | 7.25 |
| No. 1 Sisal Strings | 5.25/ | 5.50 |
| Mixed Strings | 1.50/ | 1.75 |

### Waste Paper

Base Prices to Mills for Average Packings
F.o.b. New York, Baled

| | (Per Ton) | |
|---|---|---|
| No. 1 Hard White Envelope Cuts | 105.00/ | 110.00 |
| No. 1 Hd. Wh. Shavings, unruled | 90.00/ | 95.00 |
| Super Soft White Shavings | 100.00/ | 105.00 |
| No. 1 Soft White Shavings | 85.00/ | 90.00 |
| No. 1 Fly Leaf Shavings | 45.00/ | — |
| No. 1 Gd'wd Fly Leaf Shavings | 30.00/ | 35.00 |
| No. 1 Heavy Books & Magazines | 19.00/ | 21.00 |
| Mixed Books | 13.00/ | 15.00 |
| No. 1 White Ledger | 55.00/ | 65.00 |
| Col. Ledger | 40.00/ | 45.00 |
| Manila Tab. Cards | 65.00/ | 70.00 |
| New Manila Envelope Cuttings | 70.00/ | 80.00 |
| Extra Manilas | 20.00/ | 25.00 |
| Mxd. Kraft, Bag Cuttings | 55.00/ | 60.00 |
| Kraft Envelope Cuttings | 75.00/ | 80.00 |
| Triple Sorted, No 1 Brown Soft Kraft | 40.00/ | 45.00 |
| New Kraft Corrugated Cuttings | 35.00/ | 40.00 |
| No. 1 Assorted Old Kraft | 35.00/ | 40.00 |
| Used Kraft Bags | 35.00/ | 40.00 |
| New Jute Corrugated Cuttings | 18.00/ | — |
| Old Corrugated | 14.00/ | 15.00 |
| No. 1 News | 13.00/ | 14.00 |
| No. 1 Mixed Papers | 6.00/ | 7.00 |
| Box Board Cuttings | 7.00/ | 8.00 |
| White Blank News | 65.00/ | 70.00 |
| Overissue News | 17.00/ | 18.00 |
| Sulphite Mill Wrappers | 12.00/ | 14.00 |

### Twines

All Prices Nominal, F.o.b. Mill
(Soft Fiber)

| | | |
|---|---|---|
| Coarse Polished—India | .35½/ | .36½ |
| Fine Polished India | .41½/ | .45 |
| Unpolished—Paper Makers | .32¼/ | .34½ |
| Tube Rope | .33¼/ | .35½ |
| Wrapping | .36 / | .38¾ |
| Cotton | .58 / | .60 |
| Polished Cotton | .55 / | — |
| (Hard Fiber) | | |
| Mex. Sisal | .21 / | .27 |
| Manila (Reprocessed) | .31 / | .35 |
| (American Hemp) | | |
| Polished Hemp | .46½/ | .48 |
| Unpolished | .35 / | .37¾ |

## PHILADELPHIA

### Domestic Rags (new)

(F.o.b. Eastern Shipping Point)

| | | |
|---|---|---|
| White Shirt | .10½/ | .11 |
| Light Silesias | .07½/ | .08 |
| Black Silesias, soft | .05½/ | .06 |
| Unbleached Muslin | .10½/ | .11¼ |
| Washable Prints | .06½/ | .07 |
| Washable No. 1 | .05 / | .05½ |
| Blue Overall | .07½/ | .08 |
| Washable Shredding | .02¾/ | .03¼ |
| Fancy Percales | .06¾/ | .07¼ |
| Unbleachable Khaki | .05½/ | .06½ |
| Bleachable Khaki | .06¼/ | .06¾ |
| Men's Corduroy | .05½/ | .06 |
| Ladies' Corduroy | .05 / | .05½ |
| Cottonades | .05½/ | .06 |

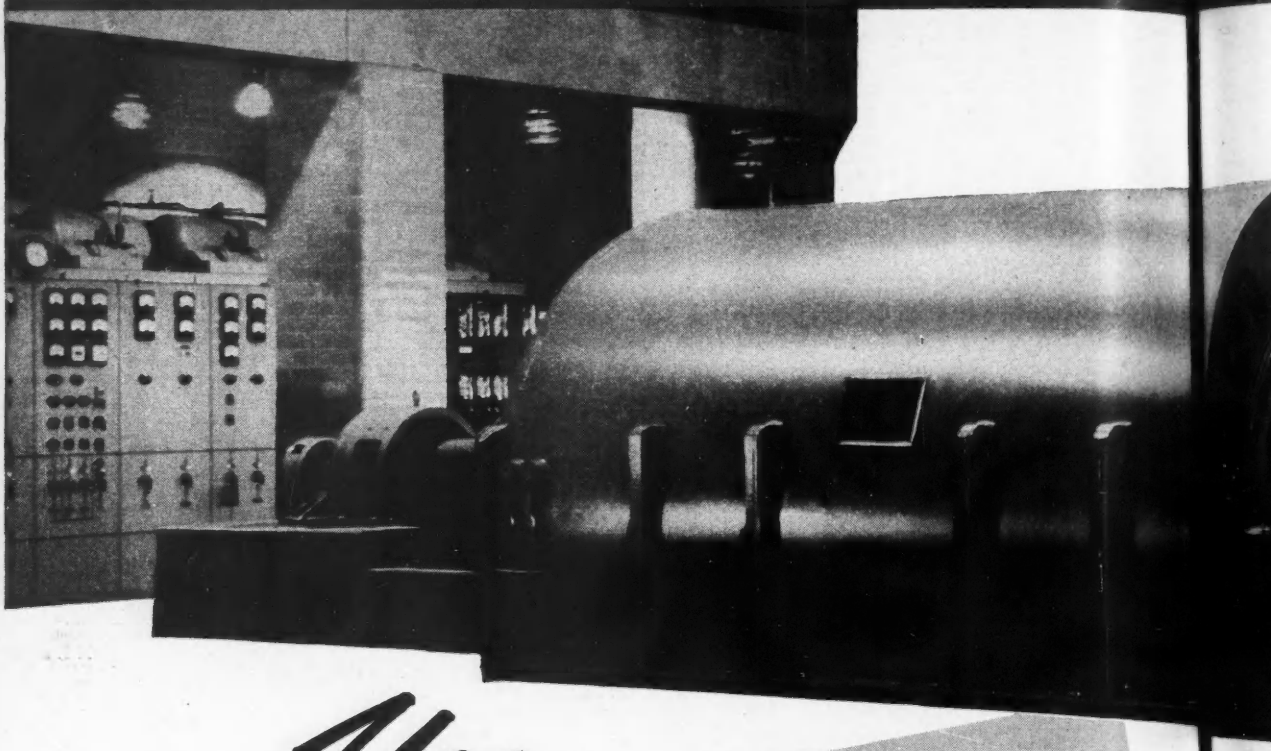
### Domestic Rags (Old)

(F.o.b. Eastern Shipping Point)

| | | |
|---|---|---|
| White No. 1—Repacked | 4.50 / | 5.00 |
| Mixed White | 4.00 / | 4.25 |
| White No. 2—Repacked | 3.50 / | 3.75 |
| Thirds and Blues— | | |
| Miscellaneous | 2.50 / | 2.75 |
| Repacked | 3.00 / | 3.25 |
| Domestic No. 1 Roofing Stock | 1.55 / | 1.60 |
| Domestic No. 2 Roofing Stock | 1.45 / | 1.50 |
| Roofing Bagging | 1.35 / | 1.40 |
| Old Manila Rope | — / | 5.50 |

*(Continued on page 28)*

# TURBINES MUST B



*...Use*

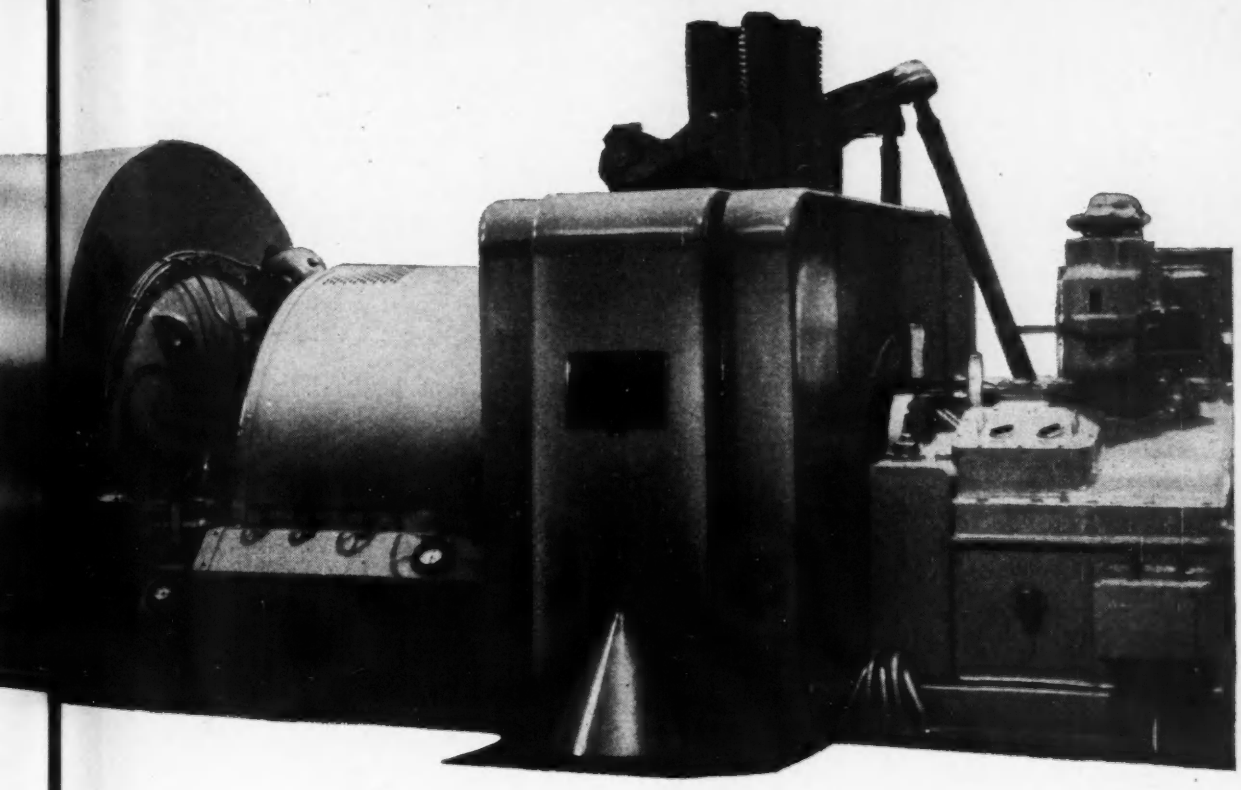
# SINTURLITE OIL

**Time out needed for cleaning or changing turbine oil is greatly reduced when Sinclair SINTURLITE is the lubricant. With SINTURLITE OIL on the job the circulating oil flows freely...continuously...keeps new oil qualities and delivers full lubricating value year in and year out.**

**SINCLAIR**

**YOUR NEAREST SINCLAIR AGENT WILL GLADLY ARRANGE**

# T BE KEPT GOING



**Sinclair SINTURLITE OILS have set an enviable performance record for standing up in the grueling day in and day out grind of continuous turbine service. SINTURLITE'S inherent high oxidation stability is strengthened by proven additives. Sludge formation and acid value are checked. Protection against rust trouble is assured because SINTURLITE OILS are rust inhibited. All the lubricating requirements prescribed by the turbine builders are provided by SINTURLITE—with margins to spare. Try SINTURLITE in your turbines.**

# INDUSTRIAL OILS

FOR LUBRICATION COUNSEL, OR YOU MAY WRITE TO SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

# Prices

CONTINUED FROM PAGE 25

### Bagging

(F.o.b. Eastern Shipping Point)

| | |
|---|---|
| Foreign Gunny No. 1 | nominal |
| Domestic Gunny No. 1 | .07¼/ .07¾ |
| Sisal Strings No. 1 | .04½/ .05 |
| Sisal Strings No. 2 | .03½/ .04 |
| Sisal Jute | .02¼/ .03 |
| No. 1 Scrap | .06½/ .07 |
| No. 2 Scrap | .03 / .03½ |

### Waste Papers

F.o.b. Phila. Mill Prices, Baled

| | Per Ton |
|---|---|
| No. 1 Hd. White Envelope Cuts.. | 120.00/ 125.00 |
| No. 1 Hd. Wh. Shavings, unruled | 100.00/ — |
| Soft White Shavings | 85.00/ — |
| White Blank News | 65.00/ 75.00 |
| No. 1 White Ledger | 65.00/ — |
| No. 1 Heavy Books & Magazines | 20.00/ 22.00 |
| New Manila Envelope Cuttings . | 75.00/ — |
| No. 1 Assorted Old Kraft | 35.00/ 40.00 |
| No. 1 Mixed Paper | 7.00/ 8.00 |
| Box Board Cuttings | 8.00/ 10.00 |
| New Kraft Corrugated Cuttings . | 55.00/ 60.00 |
| Old Corrugated | 14.00/ 16.00 |
| Overissue News | 15.00/ 16.00 |
| No. 1 News | 11.00/ 13.00 |

## BOSTON

### Waste Papers

F.o.b. Boston, Mill Prices, Baled

| | Per Ton |
|---|---|
| No. 1 Hd. Wh. Shav., unruled.. | $135.00/ — |
| No. 1 Hd. Wh. Shavings, ruled.. | 90.00/ — |
| Soft White Shavings | 120.00/ 125.00 |
| No. 1 Fly Leaf Shavings | 45.00/ — |
| No. 2 Fly Leaf Shavings | 40.00/ 45.00 |
| No. 1 Grdwd. Fly Leaf Shvgs.... | nominal |
| No. 2 Groundwood Fly Leaf Shavings | nominal |
| Mixed Colored Shavings | 30.00/ — |
| New Manila Env. Cuts, one cut | 75.00/ — |
| Hard White Envelope Cuts, one cut | 120.00/ — |
| Triple S'ted No. 1 Br. Soft Kraft | 75.00/ 80.00 |
| Mixed Kraft Env. & Bag Cuttings | 45.00/ — |
| Kraft Envelope Cuttings | 100.00/ 110.00 |
| No. 1 Heavy Books & Magazines | 22.00/ — |
| New Manila Env. Cutt'gs, one cut | 47.00/ — |
| New Manila Envelope Cuttings.. | 80.00/ 85.00 |
| White Tabulating Cards | 80.00/ 90.00 |
| White Blank News | 65.00/ — |
| No. 1 Assorted Old Kraft | 50.00/ — |
| No. 1 Mixed Paper | 8.00/ 9.00 |
| Overissue News | 11.00/ 12.00 |
| No. 1 News | 11.00/ 12.00 |
| New Corrugated Cuttings, Kraft. | 55.00/ 60.00 |
| Old Kraft Corrugated Containers | 35.00/ — |
| Old Corrugated Containers | 13.00/ 14.00 |
| Paper Strings | 40.00/ 45.00 |

### Bagging

(F.o.b. Boston)

| | (Per 100 lbs.) |
|---|---|
| Foreign Gunny | nominal |
| Domestic Gunny | 8.00 / 8.25 |
| No. 1 Old Rope | 5.75 / 6.25 |
| Mixed Strings | 1.35 / — |
| Transmission Rope— | |
| Foreign | nominal |
| Domestic | 4.00 / — |
| Foreign Manila Rope | nominal |
| Domestic Manila Rope | 6.50 / — |
| Jute Carpet Threads | — / 4.00 |
| Bleachery Burlap | — / 9.00 |
| Scrap Burlap— | |
| Foreign | 6.50 / 6.75 |
| Domestic | 6.75 / 7.00 |
| South America | 6.75 / 7.00 |
| Austr. Wool Pouches | 8.00 / — |
| New Zealand Wool Pouches | — / 5.50 |
| New Burlap Cuttings | 8.50 / — |
| Heavy Baling Bagging | 8.00 / 8.50 |
| Paper Mill Bagging | — / 6.00 |
| No. 1 Roofing Bagging | — / 1.40 |

### Domestic Rags (New)

(F.o.b. Boston)

| | (Per 100 lbs.) |
|---|---|
| New Light Prints | nominal |
| Fancy Percales | 7.00 / — |
| White No. 1 Shirt | 11.00 / — |
| Light Flannelettes | 8.00 / — |
| Canton Flannels, Bleached | 10.00 / — |
| Underwear Cutters, Bleached | 11.00 / — |
| Underwear Cutters, Unbleached | 10.50 /12.00 |
| Silesias No. 1 | 7.25 / — |
| Black Silesias | 4.50 / — |
| Red Cotton Cuttings | 4.50 / — |
| Blue Overalls | — / 8.00 |
| Soft Unbleached | 11.00 / — |
| Blue Cheviots | 7.00 / — |
| Fancy | 5.50 / — |
| Washable | 6.00 / — |
| Khaki Cuttings | 6.00 / — |
| Corduroy | 4.00 / — |
| Men's Corduroy | 4.50 / — |
| Khaki Canvas | — / 6.00 |
| B. V. D. Cuttings | 11.00 / — |

### Domestic Rags (Old)

(F.o.b. Boston)

| | Per 100 lbs. |
|---|---|
| No. 1 Whites, Repacked | 4.75 / 5.00 |
| No. 1 Whites, Miscellaneous | 4.25 / 4.75 |
| No. 2 Whites, Repacked | 2.50 / — |
| No. 2 Whites, Miscellaneous | 2.00 / — |
| Twos and Blues, Repacked | 1.25 / — |
| Old Blue Overalls | 4.00 / 4.50 |
| Thirds and Blues, Repacked | 2.00 / — |
| Black Stockings | 3.00 / 3.50 |
| No. 1 Roofing Stock | 1.55 / — |
| No. 2 Roofing Stock | 1.45 / — |
| No. 3 Roofing Stock | 1.25 / — |
| No. 4 Roofing Stock | 1.25 / — |
| No. 5, Quality A. | 1.35 / — |
| Old Manila Rope | 6.00 / — |

## CHICAGO

### Waste Paper

(F.o.b. Chicago) Mill Prices, Baled

| | |
|---|---|
| Shavings— | |
| No. 1 Hard White Envelope cuts, one cut | $100.00/ — |
| No. 1 Hard White Shavings, unruled | 90.00/ — |
| No. 1 Soft White Shavings | 80.00/ — |
| No. 1 White Ledger | 60.00/ — |
| No. 1 Heavy Books & Magazines | 28.00/ 30.00 |
| White Blank News | 50.00/ — |
| Mixed Kraft Env. & Bag Cuttings | 70.00/ — |
| No. 1 Assorted Old Kraft | 25.00/ — |
| Overissue News | 22.00/ — |
| No. 1 News | — / 18.00 |
| No. 1 Mixed Paper | 9.00/ — |
| Old Corrugated | 14.00/ 15.00 |
| Mill Wrappers | 11.00/ — |

# Markets

### Blanc Fixe

Supply good; demand steady. Pulp is currently quoted at $85.00 in bags, car lots at works, 6 cents per pound, l.c.l., deld.; by-product $75.00 per ton, car lots, at works, 6 cents per pound, l.c.l., deld.

### Bleaching Powder

Demand strong. Supply adequate. Prices firm. Export inquiry good. Prices range from $4.25 to $4.75 per 100 pound drums, l.c.l. works.

### Casein

Domestic prices firm, September production declines to third lowest month in 25 years. Manufacturers' holdings good. Demand light. Trading in imported product dull. Current prices on processed acid precipitated casein at 28½ to 32 cents per pound for domestic grades and .26 to .28 cents for imported grades, f.o.b. shipping point.

### Caustic Soda

Easier demand has improved supply of dry and liquid types. Some 1949 contracts reported at present price levels. Solid caustic is reported at $3.10 per cwt.; flaked and ground is quoted at $3.50 per cwt. in 400 pound drums, $4 to $4.25 per cwt. in 100 pound drums—car lots at works; liquid 50 percent in tank cars at $2.60 per cwt.; liquid 73 percent in tank cars at $2.60 per cwt., at works.

### China Clay

Demand steady. Supply excellent. Domestic filled clay is $9 to $11.50 per ton, car lots; coating clay is $14 to $22. Imported clay quotation, short tons, $16 to $35, export warehouse.

### Chlorine

Pickup in demand tightens supply. Shortage of tankcars hampers delivery. One manufacturer advances price. (See page 24). Currently quoted at $2.40 per cwt. in single unit tank cars; at $2.70 to $3.90 per cwt., in multi-tank cars, f.o.b., works.

### Rosin

Prices steady. Heavy foreign inquiry stimulates buying. Market strong. Supply outside loan lessens. Gum rosin in drums per 100 pounds net in car lots, f.o.b., Savannah; B, $6.50; G, H, I, K, $7.75. Wood rosin per 100 pounds net, car lots, f.o.b. Savannah; B, $5.00; FF, $6.50.

### Rosin Size

Heavy demand. Supply good. Seventy percent gum and pale wood grades, tank cars, $6.30 to $6.40, f.o.b. southern shipping point.

### Salt Cake

Supply somewhat easier. Heavy kraft production keeps demand steady. Production under contract. Domestic salt cake quoted at $25 to $28.

### Soda Ash

Supply continues to improve. Deliveries close to schedule. Current prices sustained in some 1949 contracts. Current prices, car lots per 100 pounds; in bulk, $1.15; in paper bags, $1.40; and in barrels, $1.90.

### Sodium Bicarbonate

Production good. Demand eased by better supply of other alkalis. Reported as $1.93 per cwt. paper bags, carload lots.

### Starch, Corn

Prices look firm following a 50c drop. U. S. record crop brings world production to a record total. Demand moderate. Pearl grade quoted at $5.41 per 100 pounds; powdered starch at $5.52 per 100 pounds; car lots, New York.

### Starch, Potato

Dip in corn starch prices reacts on potato. Idaho now near cost basis and firmer. Maine still unsteady. Demand good and improving. High grade quoted at $4.45/$4.50 cwt. f.o.b. Idaho; $4.75/$4.95 f.o.b. Aroostook; Pearl grade $4.60/$4.80 cwt. f.o.b. Aroostook.

### Sulphate of Alumina

Demand increased. Supply steady. The commercial grades are quoted from $1.50 per 100 pounds, in bags, car lots, f.o.b. works. Iron free is $2.50 per 100 pounds in bags, car lots, at works.

### Sulphur

Demand active. Supplies steady. Production up 3 percent. Annual contracts are quoted at $18 per long ton, f.o.b. mines; the price f.o.b. at Gulf ports is $22.00 per long ton.

### Talc

Demand continues in excess of supply. Improvement seen by early 1949. Prices steady. Domestic grades are currently quoted at $23 per ton in paper sacks, f.o.b. mills; Canadian at $35 and up per ton. All prices in car lots.

### Tapioca Flour

High grades in fair supply. Steady improvement in buying noted. Superior highs range from $10.25/$11.50 cwt.; high grades $9.25 cwt., on dock Atlantic and Gulf ports; medium grades range from $6.00/$7.50 cwt., on dock N. Y. Coarse pearl grades, $5.00/$5.50 cwt., on dock N. Y. Medium and low grades in adequate supply.

### Titanium Dioxide

Supply of paper grades continues unequal to demand. Shipments on allocation. Anastase 18c pound carload lots, 18½-19c l.c.l., rutile, 20c pound carload lots, 20½-21c l.c.l.; 50-pound bags, f.o.b. plant, minimum freight allowance.

# Somebody's going to hear about this!

The customer's holding the bag right now—but not for long. Some paper maker is going to lose business because the bag wasn't *wet-strengthened* with UFORMITES.

In all kinds of paper products where wet strength counts—count on UFORMITES. As little as 1% resin solids on dry fibre weight boosts wet tensile strength as much as 300%—increases wet rub and scuff resistance—improves dry tensile, Mullen, fold, uniformity of sizing and coating surface characteristics.

There's no pretreatment, special processing or new equipment needed. For Kraft stocks, merely add UFORMITE 467 to the beater—just as you would a rosin size. For sulfite, rag, groundwood—where low acidity is essential—add UFORMITE 470 anywhere at the wet end of the machine. Both UFORMITES are infinitely dilutible with water,—well suited to use at low concentrations usually employed in paper stock systems.

Whether you manufacture bags, wrapping paper, toweling, soft tissues, glassine, map, chart or ledger paper, UFORMITES can increase the value of your product. Write today for full details and samples of these urea formaldehyde resins.

**Handy Facts on Wet Strength**

Your copy of this free booklet will answer your technical questions about how the UFORMITES are used to increase wet strength. Write today.

UFORMITE *is a trade-mark, Reg. U.S. Pat. Off.*

CHEMICALS FOR INDUSTRY

**ROHM & HAAS COMPANY**

**THE RESINOUS PRODUCTS DIVISION**

Washington Square Philadelphia 5, Pa.

The Resinous Products Division was formerly The Resinous Products & Chemical Company

# Financial Record

| | Per Share Calendar Year 1947 | Earnings 12 Mos. to Approx. 9/30/48 | Indic. Annual Divid. Rate | Nov. 10 Closing Market Price |
|---|---|---|---|---|
| **Preferred Stocks** | | | | |
| Armstrong Cork Co. $3.75 Cum. | $38.64* | $43.53*i | $3.75 | 94¾ |
| Armstrong Cork Co. $4.00 Cum. Conv. | 38.64* | 43.53*i | 4.00 | 103 |
| Celotex Corp. 5% Cum. | 24.25c | 26.25g | 1.00 | |
| Champion Paper & Fibre $4.50 Cum. | 65.90f | | 4.50 | |
| Container Corp. of Amer. 4% Cum. | 102.74 | 98.49 | 4.00 | |
| Crown Zellerbach $4.20 Cum. | 56.40f | 55.07g | 4.20 | |
| Crown Zellerbach $4.00 Cum. Conv. 2nd | 211.39f | 217.70g | 4.00 | |
| Dixie Cup Co. $2.50 Cum. Conv. Cla | 9.16 | 9.61 | 2.50 | |
| Flintkote Co. $4 Cum. | 81.91 | 87.68 | 4.00 | |
| Robert Gair Co., Inc. 6% Cum. | 18.01 | 15.97 | 1.20 | |
| International Paper Co. $4 Cum. | 236.51 | 245.85i | 4.00 | |
| Johns-Manville $3.50 Cum. | 128.81 | 175.15 | 3.50 | 107 |
| Kimberly Clark Corp. 4½% Cum. | 70.03 | 82.79 | 4.50 | |
| Kimberly Clark Corp. 4% Cum. Conv. 2nd | 95.88 | 114.55 | 4.00 | 95¼ |
| MacAndrews & Forbes 6% Cum. | 62.20 | 59.89 | 6.00 | |
| Mead Corp. 4¼% Cum. | 81.56 | 80.43 | 4.25 | |
| Mead Corp. 4% Cum. Conv. 2nd | 53.34 | 51.89 | 2.00 | |
| Paraffine Cos. Inc. 4% Cum. Conv. | 152.76a | 158.96 | 4.00 | 100½ |
| Rayonier Inc. $2 Cum. | 13.58 | 16.09 | 2.00 | 32¼ |
| St. Regis Paper Co. 4.40% 1st A | 76.93 | 85.00 | 4.40 | 85 |
| Scott Paper Co. $3.40 Cum. | 43.95 | 54.31 | 3.40 | 88 |
| U. S. Gypsum Co. 7% Cum. | 211.34 | 300.59 | 7.00 | 169 |
| United Wallpaper Inc. 4% Cum. Conv. | (d)1.35a | | 2.00 | |
| West Virginia Pulp & Paper 4½% Cum. | 75.75c | 78.49g | 4.50 | |
| **Common Stocks** | | | | |
| APW Products Co. | $1.24 | $1.46i | $0.25 | 4⅜ |
| American Writing Paper Corp. | 1.61 | 0.02 | 0.25 | 5⅛ |
| Armstrong Cork Co. | 6.41 | 7.17i | 2.60 | 46½ |
| Celotex Corp. | 6.59c | 7.15g | 2.00 | 24⅛ |
| Certain-Teed Prods. Corp. | 3.75 | 3.99 | 0.90 | 13⅛ |
| Champion Paper & Fibre | 5.57f | | 2.00 | 22⅛ |
| Congoleum Nairn Co. | 4.55 | 5.12i | 2.00 | 31⅜ |
| Container Corp. of America | 10.09 | 9.54 | 4.50 | 33⅜ |
| Crown Zellerbach | 6.81f | 6.53g | 2.00 | 25½ |
| Dixie Cup Co. | 5.87 | 6.26 | 1.00 | 27 |
| Flintkote Co. | 6.27 | 6.28 | 3.00 | 31⅛ |
| Robert Gair Co. Inc. | 2.83 | 2.49 | 0.40 | 6¾ |
| Great Northern Paper Co. | 4.56 | 4.44i | 2.40 | |
| International Paper Co. | 15.02 | 15.62i | 4.50 | 54¼ |
| Johns-Manville Corp. | 3.17 | 4.28 | 1.40 | 35⅜ |
| Kimberly-Clark Corp. | 4.29 | 5.16 | 1.40 | 20⅜ |
| MacAndrews & Forbes Co. | 3.68 | 3.53 | 2.50 | 37 |
| Marathon Corp. | 3.39c | 3.93g | 1.40 | 21⅜ |
| Mead Corp. | 7.33 | 7.11 | 2.00 | 16¼ |
| National Container Corp. | 4.13 | 3.11i | 1.20 | 10 |
| Paraffine Cos. Inc. | 2.40a | 2.50 | 1.20 | 21¼ |
| Rayonier, Inc. | 7.30 | 5.88 | 2.00 | 27⅞ |
| Ruberoid Co. | 10.88 | 12.13i | 2.75 | 58 |
| St. Regis Paper Co. | 2.66 | 2.86 | 0.80 | 9⅛ |
| Scott Paper Co. | 3.02 | 3.79 | 2.50 | |
| Sutherland Paper Co. | 6.87 | 6.43 | 2.50 | 39¼ |
| Taggart Corp. | 1.29 | | 0.60 | |
| Union Bag & Paper Corp. | 7.93 | 8.13 | 3.00 | 28¾ |
| United Board & Carton | 4.95b | 3.39h | 1.00 | 8⅛ |
| U. S. Gypsum Co. | 10.00 | 14.36 | 6.00 | 100 |
| United Wallpaper | (d)0.11a | | —— | 3½ |
| West Virginia Pulp & Paper | 11.40c | 11.56g | 4.00 | 40¾ |

(a) Year ended 6/30/48
(b) Year ended 5/30/48
(c) Year ended 10/31/47
(d) Deficit
(f) Year ended 4/30/48
(g) 12 months to approximately 7/31/48
(h) 12 months to 8/21/48
(i) 12 months to approximately 6/30/48
(*) Pro forma

## Dividends Declared

*Union Bag & Paper Corp.* Quarter ended September 30, 1948. Net sales, $18,505,620 compared with $19,076,336 in the preceding quarter and $15,927,941 in the corresponding period of 1947. Net income in the third quarter of 1948 was $3,272,969, equal to $2.21 per share on the 1,483,298 shares of capital stock outstanding compared with $3,621,212 or $2.44 per share on the same amount of stock in the June quarter of this year and $3,043,883 or $2.39 per share in the September quarter last year on the 1,271,437 shares then outstanding. For the nine months ended September 30, 1948, sales were $56,968,223, an increase of 24 percent over the $46,025,458 sales in the similar period a year ago. Net income for the nine months ended September 30, 1948, was $10,546,336, largest in the company's history for any nine-month period. These earnings were equal to $7.11 per share on the presently outstanding shares and compare with net income for the comparable period in 1947 of $8,787,425 or $6.91 per share on the 1,271,437 shares then outstanding.

*Minnesota & Ontario Paper Co.* — Net sales for the nine months ending September 30, 1948 were $39,546,273 as compared to $35,916,919 for the same period in 1947. Profits after taxes and reserve for contingencies for this period, subject to audit, were $4,542,684 ($3.52 per share outstanding) as compared with a profit, after taxes and reserve for contingencies for the corresponding period in 1947 of $4,117,778 ($3.21 per share outstanding).

*Marathon Corp.* declared quarterly dividends on October 15 on both the common and preferred stock of the company. The common dividend of 35 cents a share is payable November 30, to stockholders of record November 10. The preferred dividend of $1.25 a share is payable January 3, 1949, to stockholders of record December 20, 1948. Amounts of both dividends are net after provision for Wisconsin privilege dividend tax.

*St. Regis Paper Co. and Subsidiaries.* Three months ended September 30; net income, $3,303,257, after taxes and charges, equal after preferred dividends to 60 cents a share on 5,170,714 common shares; year ago, $3,358,997 and 60 cents a share; nine months sales, $123,416,387, compared with $103,953,481; net income, $12,048,192, equal to $2.21 a share; year ago, $11,055,144 and $2 a share.

## Mersey Preferred Issue

TORONTO — An offering of 15,000 shares of Mersey Paper Co., Ltd., 4½ percent cumulative, redeemable preference stock is being made by Royal Securities at $99.50 per share. These are previously outstanding shares and do not represent new financing.

## Scrip Conversion Extended

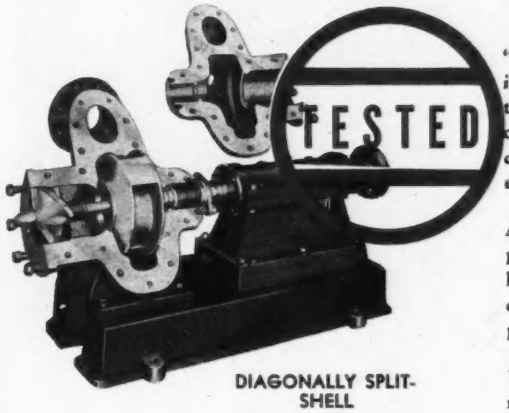
NEW YORK — The Robert Gair Co., Inc., told *Paper Trade Journal* on October 26 that it had extended to March 31, 1950, the period within which its common stock scrip certificates may be combined and exchanged for full shares of common stock.

## 2-for-1 Stock Split

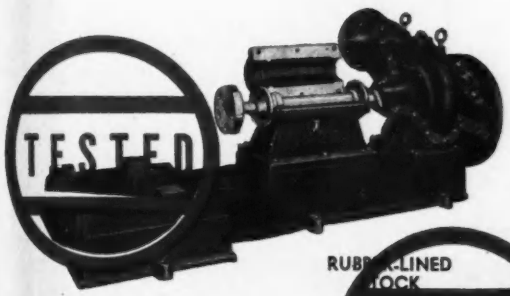
ERIE, Pa. — Hammermill Paper Co. stockholders on November 1 approved a proposal to split the common stock 2-for-1, effective on or about November 15.

CENTRIFUGAL PUMPS FOR EVERY SERVICE

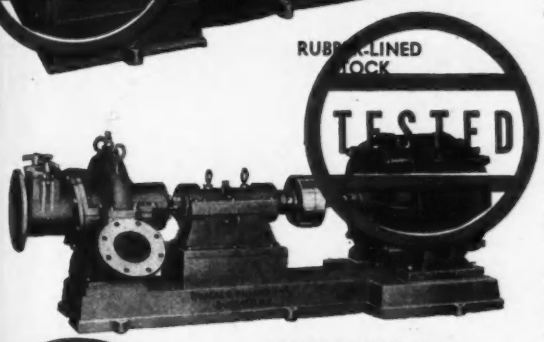
# The "Stamp of Approval" that means TOP PUMP PERFORMANCE for you!




DIAGONALLY SPLIT-SHELL




RUBBER-LINED STOCK




HORIZONTALLY SPLIT-SHELL SINGLE SUCTION

SINGLE SUCTION CHEMICAL

"Buffalo" Pumps have been *tested in use*—tried, proved and improved through the years, so that today you can be sure of the "tops" in efficient, trouble-free operation whenever you install "Buffalo".

An important ingredient in "Buffalo" pump manufacture is the technical knowledge that comes from years of contact with the actual operation of paper mills.

In addition, the experience gained in many fields—as shown in the panel listing at right—has played a vital role in the development of "Buffalo" Pumps of highest efficiency for paper-mill service.

Here are some examples:

"Buffalo" Diagonally Split-Shell Pump—ideal for handling high consistency stock with low submergence, or for any service where uniform flow is required.

"Buffalo" Rubber-Lined Stock Pump—for continuous, trouble-free service in working with corrosive liquids such as hypochloric or chlorinated paper stock. All exposed parts covered with hard or medium rubber according to liquid used.

"Buffalo" Horizontally Split-Shell Single Suction Pump—made to withstand hardest usage on "high head" jobs.

"Buffalo" Single Suction Full Ball Bearing Chemical Pump—for efficient smaller-capacity handling of size, lime, clay solutions, silicate of soda, etc.

*Get the full story of tested-in-use "Buffalo" Pumps. Write for Bulletin 953-F—today.*

PUMPS by "Buffalo"

## For

- WATER ANY TEMPERATURE
- PAPER STOCKS (NON-CLOGGING)
- GENERAL SERVICE
- ACIDS
- ALKALIS
- SLURRY
- CONDENSATE RETURN
- SUMP CLEARANCE
- FIRE SERVICE
- SEWAGE
- SELF-PRIMING SERVICE

# BUFFALO PUMPS, INC.

159 Mortimer Street Buffalo, N. Y.

Canada Pumps, Ltd., Kitchener, Ont.

RUGGED, PRECISION CONSTRUCTION—FOR LONG LIFE

# Obituary

*Clifton N. Nilson,* 43, development engineer associated with E. D. Jones & Sons Co., Pittsfield, Mass., died suddenly on November 2.

*George Herbert Allen, 72,* vice-president of the Buntin-Reid Paper Co., Toronto, Can., died at his home in that city on October 30. Mr. Allen was a past vice-president of the Canadian Paper Trade Ass'n.

*Potter V. Park,* 42, comptroller and purchasing agent of the Fox River Paper Corp., Appleton, Wis., was killed instantly on October 27 when his automobile struck a truck parked without lights on a trunk highway near Appleton.

*George H. Harvey,* 82, production manager of the Gardner-Richardson Paper Co., died of pneumonia at Middletown, Ohio, on October 31. With the elder Mr. Gardner and his son, E. T. Gardner, Mr. Harvey formed the Colin Gardner Paper Co. in 1900, predecessor of today's Gardner-Richardson Co.

## AMERICAN PAPER AND PULP ASSOCIATION'S PRODUCTION RATIO REPORT*

(Production as per cent of six-day capacity)

### COMPARATIVE WEEKLY SUMMARIES

| Current Weeks—1948 | | Corresponding Weeks—1947 | |
|---|---|---|---|
| September 25 | 98.4 | September 27 | 107.0 |
| October 2 | 98.6 | October 4 | 109.5 |
| October 9 | 98.4 | October 11 | 108.4 |
| October 16 | 99.9 | October 18 | 108.3 |
| October 23 (Revised) | 98.7 | October 25 | 110.2 |
| October 30 | **100.2 | November 1 | 111.1 |

### COMPARATIVE MONTHLY SUMMARIES

| 1947 | | | | | | 1948 | |
|---|---|---|---|---|---|---|---|
| Jan. | 102.1 | May | 106.2 | Oct. | 109.5 | Jan. | 100.3 |
| Feb. | 105.9 | June | 106.2 | Nov. | 109.3 | Feb. | 99.8 |
| Mar. | 106.1 | July | 95.5 | Dec. | 101.5 | Mar. | 100.8 |
| Apr. | 105.1 | Aug. | 104.2 | | | Apr. | 100.8 |
| | | Sept. | 102.0 | Year Avg. | 104.3 | May | 100.5 |
| | | | | | | June | 95.7 |
| | | | | | | July | ‡88.1 |
| | | | | | | Aug. | ‡96.8 |
| | | | | | | Sept. | ‡91.8 |

‡ Preliminary Ratios.

### COMPARATIVE YEARLY SUMMARIES

| | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 |
|---|---|---|---|---|---|---|---|---|
| Year to Date | 96.4 | 91.9 | 88.3 | 88.4 | 89.1 | 101.2 | 104.3 | 97.1 |
| Year Average | 97.4 | 90.4 | 87.8 | 88.1 | 89.4 | 101.1 | 104.3 | |

** Indicates 1948 volume of 180,541 tons—Comparable week 1947—176,075.

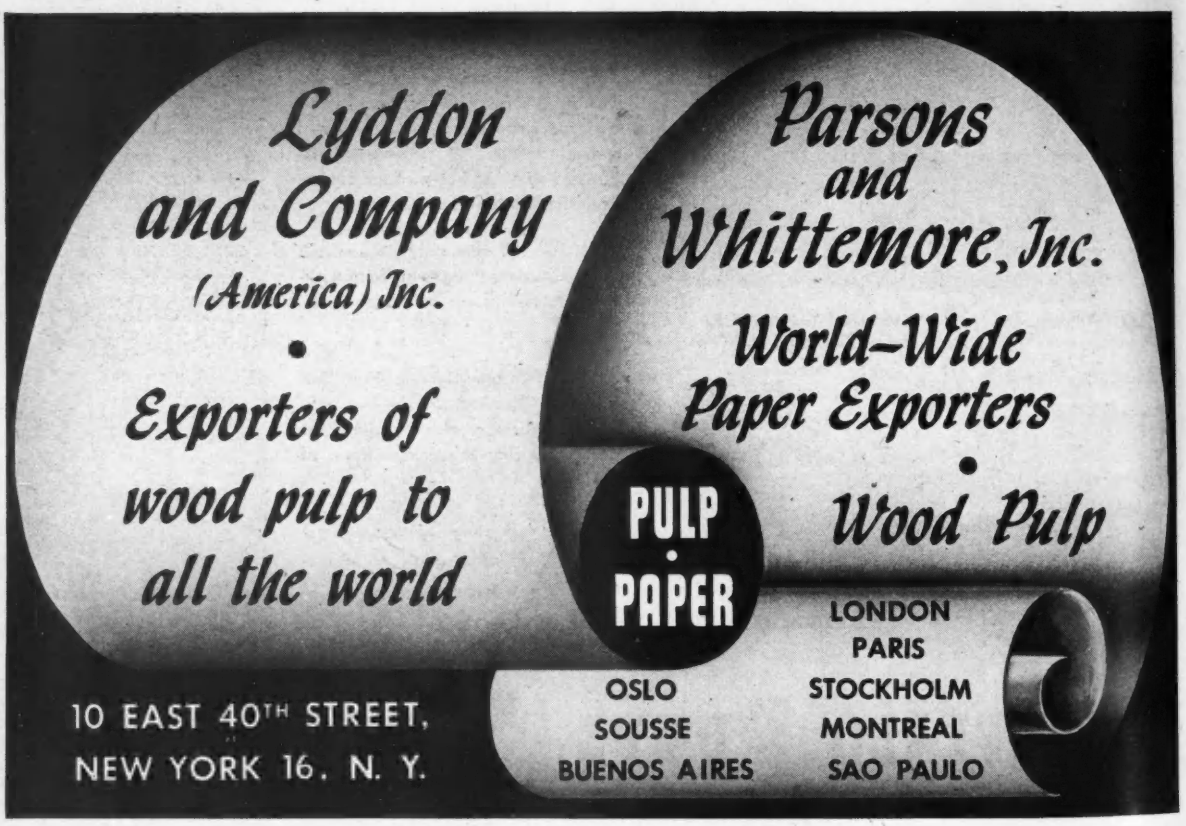
### PAPERBOARD OPERATING RATIOS†

| Current Weeks—1948 | | Corresponding Weeks—1947 | |
|---|---|---|---|
| September 25 | 94 | September 27 | 102 |
| October 2 | 96 | October 4 | 100 |
| October 9 | 96 | October 11 | 102 |
| October 16 | 97 | October 18 | 101 |
| October 23 | 95 | October 25 | 101 |
| October 30 | 96 | November 1 | 100 |

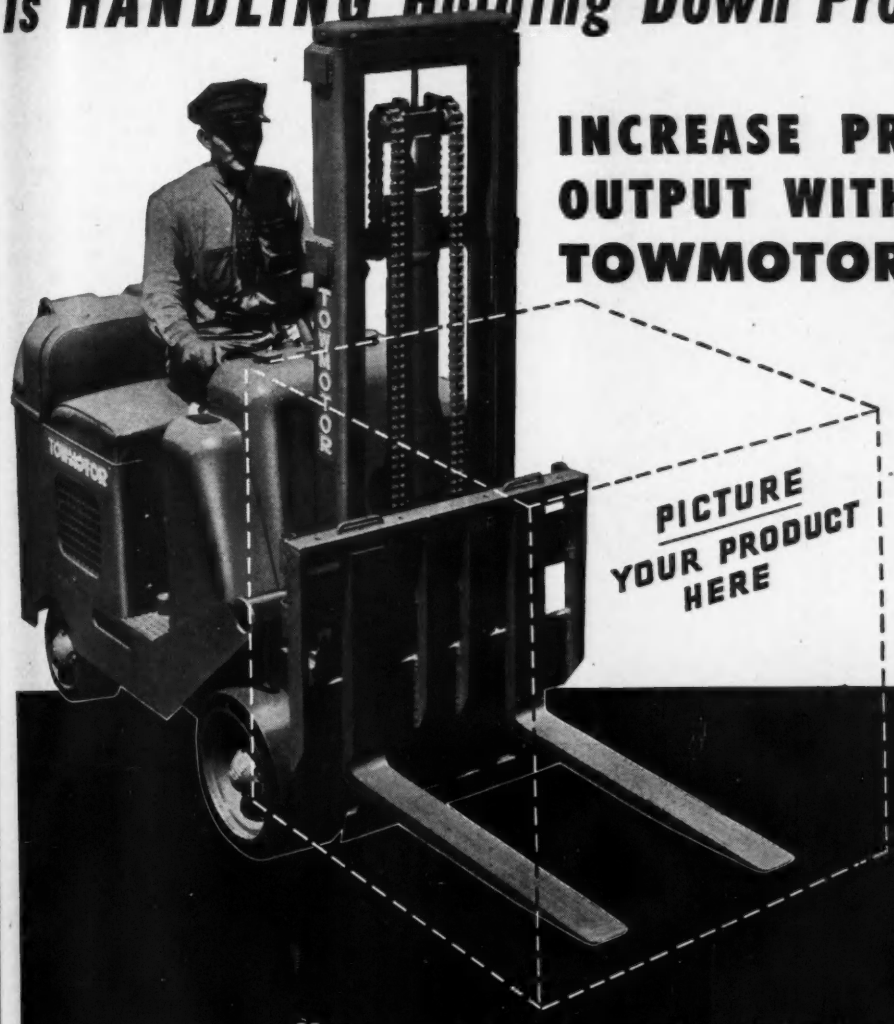
| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Year Avg. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1947 | 99 | 103 | 101 | 100 | 101 | 101 | 90 | 99 | 96 | 101 | 99 | 89 | 98 |
| 1948 | 99 | 100 | 102 | 102 | 100 | 94 | 81 | 92 | 91 | | | | |

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

# Is HANDLING Holding Down Production?




## INCREASE PRODUCTIVE OUTPUT WITH TOWMOTOR MH*

*MH is Mass Handling, the systematic movement of the most units, in the shortest time, at the lowest cost.

**See Our Exhibit—**
*3rd National Materials Handling Exposition, Philadelphia Convention Hall, Jan. 10-14, 1949.*

Missing out on production quotas? Then check up on your handling operations . . . chances are you need Towmotor Mass Handling to help you get the most from modern production machinery and skilled production workers. Towmotor handling is modern handling at its best. It keeps production lines humming, pares time and labor costs, puts overhead storage space to work.

Towmotor Fork Lift Trucks, Tractors and Accessories are designed for fast, safe handling of materials and products of every type, size and shape. Gasoline-powered to stay on the job twenty-four hours a day, every day . . . available in models and capacities to meet the needs of every plant in every industry. Towmotor is the answer to your handling problem.

The cost of Towmotor operation? The men who make handling pay a profit have the answer: More professional handlers use Towmotor than any other fork lift truck.

**FREE**
**Handling Information**

*HANDLING MATERIALS ILLUSTRATED, containing helpful information on handling operations in every type of industry, will be mailed regularly to you, without cost or obligation. Write today for your FREE copy of the current issue.*

**TOWMOTOR CORPORATION**
DIVISION 17, 1226 EAST 152ND ST., CLEVELAND 10, OHIO
*Representatives In All Principal Cities*

**TOWMOTOR** *THE ONE-MAN-GANG* **FORK LIFT TRUCKS** *and* **TRACTORS**

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

# Meetings

**ASSOCIATION EXECUTIVES: Please send us your meeting dates and locations for this column as far in advance as possible. No charge for publication.**

*NOVEMBER 16:* American Society for Testing Materials, Cleveland District. Cleveland Engineering Society.

*NOVEMBER 18-19:* Production Conference, American Management Ass'n. Hotel Drake, Chicago.

*NOVEMBER 19:* American Society for Testing Materials, New England District. Hotel Sheraton, Worcester, Mass.

*NOVEMBER 29:* American Society for Testing Materials, Pittsburgh District, Mellon Institute.

*NOVEMBER 29-DECEMBER 4:* National Exposition of Power and Mechanized Engineering, Grand Central Palace, New York City.

*DECEMBER 2-3:* Insurance Conference, American Management Ass'n., Hotel Drake, Chicago.

*DECEMBER 3-4:* Pacific Coast Division, American Pulp & Paper Mill Superintendents Ass'n., New Washington Hotel, Seattle, Wash.

**1949**

*JANUARY 13:* American Society for Testing Materials, Philadelphia District. Franklin Institute.

*JANUARY 20-21:* Finance Conference, American Management Ass'n. Hotel Pennsylvania, New York.

*FEBRUARY 3:* American Society for Testing Materials, New York District. Engineering Society Building.

*FEBRUARY 10:* American Society for Testing Materials, Philadelphia District. McAllister's, 1811 Spring Garden Street.

*FEBRUARY 14-16:* Personnel Conference, American Management Ass'n. Palmer House, Chicago.

*FEBRUARY 20-25:* Annual Convention, American Paper & Pulp Ass'n. Hotel Waldorf-Astoria, New York. For details, write to E. W. Tinker, Executive Secretary, 122 East Forty-Second Street, New York 17, N. Y.

*FEBRUARY 22:* SAPI Luncheon. Hotel Waldorf-Astoria. For details, write to E. G. Amos, Secretary-Treasurer, Salesmen's Ass'n. of the Paper Industry, 122 East Forty-Second Street, New York 17, N. Y.

*FEBRUARY 28-MARCH 4:* Spring Meeting and A.S.T.M. Committee Week, American Society for Testing Materials. Edgewater Beach Hotel, Chicago.

*MARCH 17-18:* Marketing Conference, American Management Ass'n. Hotel Pennsylvania, New York.

*MARCH 22:* American Society for Testing Materials, Philadelphia District. Franklin Institute.


salt cake

98%-99% PURE

Available from Saskatchewan Mineral's new natural sodium sulphate plant at Chaplin, Saskatchewan.

- Independent analysis give purity in EXCESS of 98% (figures and sources on request).
- Productive capacity at peak, 150,000 tons per year.
- RELIABILITY OF DELIVERIES:
  1—Large stock pile of raw salt.
  2—Storage facilities at plant for several thousand tons of salt cake.
  3—Location directly on main trans-continental line of Canadian Pacific Railway assures uninterrupted service.

*Complete information and prices on request to:*

Saskatchewan MINERALS

Sodium Sulphate Division

REGINA • SASKATCHEWAN


## Sulfite Recovery Process

*(Continued from page 7)*

in a cyclic process in which the entire mill effluent is evaporated and burned and the residual dust and gas is transformed into a strong raw acid for reuse in the cooking of the chips.

The wood chips are cooked under pressure in digesters. After the cooking is completed the digesters are relieved to atmospheric pressure and the pulp and residual liquor dumped into huge horizontal tanks. The contents of the tanks are then pumped to the knotters and pulp washers. When separated from the pulp, the residual or waste liquor, with a solid content of from 12 to 14 percent, is ready for evaporation.

Before entering the multiple-effect evaporators, where it is concentrated to 50 to 55 percent solids, the sulfite waste liquor is neutralized with recovered magnesium oxide to prevent loss of any sulfur dioxide during evaporation. Further concentration is carried out in cascade evaporators.

The concentrated waste liquor is then burned in a recovery furnace under self-sustaining combustion conditions for the generation of steam in the associated boiler and the removal of the highly reactive ash produced in suspension in the flue gases leaving the boiler.

The suspended magnesium oxide ash is collected in a series of cyclonic separators and conveyed to gas absorption towers in the form of a slurry, while the sulfur dioxide passes off in the flue gases. The flue gases are subsequently cooled and then sent to the gas absorption towers where the slurry of recovered magnesium oxide is fed downwardly counter-current to the rising sulfur dioxide gas which it absorbs.

The combination of magnesium oxide with sulfur dioxide completes the cycle. The resultant acid is fortified with sulfur burner gas to the extent necessary to compensate for the unavoidable losses occurring throughout the system, and it is then returned to the sulfite mill digester building where it is further fortified by the digester relief gases and eventually used again in the chip-cooking process and again goes through the cycle of chemical recovery and heat production.

When in operation the Weyerhaeuser magnesium bisulfite mill will dispose of 100 percent of the waste liquor which would otherwise go into the Columbia River at Longview.

It is expected that pulp of a higher quality than calcium base pulp will be produced with the magnesia base process because the greater solubility of the magnesium compounds will facilitate the pulp washing operation and result in fewer impurities in the finished pulp.

### Single Recovery and Power Dept.

The Weyerhaeuser plant has an arrangement which is considered to be unique in the pulp industry. This is a single recovery and power department serving both the sulfite mill and the

new 200-ton kraft pulp mill which is also about to be put in operation. Much of the slab wood and wood trim previously used as hogged fuel to produce the power for the original sulfite mill is no longer needed for that purpose because of the magnesium oxide plant. This wood will be utilized as raw material for the new kraft mill.

B & W recovery furnaces and boilers are used for both the magnesium oxide and the kraft mills, and are located in communicating boiler rooms without separating walls. In contrast to the conventional seven-floor kraft boiler room, the magnesium oxide side of the building requires only three floors. Both the kraft and the sulfite recovery boilers have the same design pressure of 615 psi and total steam temperature of 700°F. Each 137½ ton sulfite recovery unit shows a relatively higher steam production with 69,600 lbs. of steam per hour as compared with the 220-ton kraft recovery unit with a generating capacity of 101,200 lbs. of steam per hour.

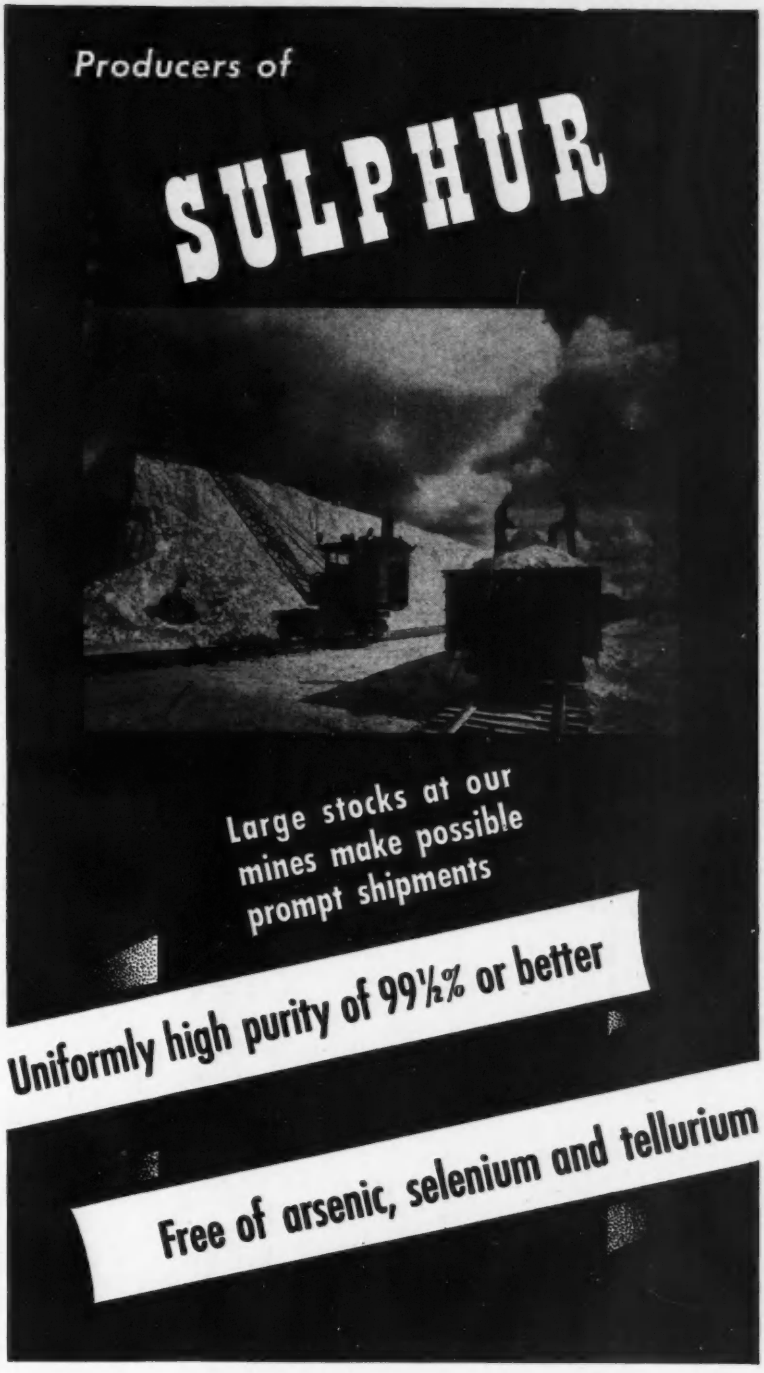
The combined boiler plant produces the steam for two 6,250 kva turbo-generators in an adjoining room in which the power is generated for operating the two pulp mills. These turbines exhaust at 35 psi pressure and bleed at 135 psi and are fully automatically controlled from a central control board.

### Licensing of Process

This cyclic recovery process will be made available to the pulp industry by granting licenses under patents on terms best adapted to a widespread use of the process. The Babcock & Wilcox Co., 85 Liberty street, New York 6, N.Y., will serve as the exclusive licensing agent.

### Equipment and Supplies

Knotters—*Bird Machine Co.*
Washers—*Oliver United Filters, Inc.*
Washer controls—*Foxboro Co.*
Tank and tower linings — *Stebbins Eng. & Mfg. Co.*
Evaporators — *General American Transportation Corp.*
Recovery furnaces and boilers — *Babcock & Wilcox Co.*
Boiler control equipment — *Bailey Meter Co.*
Cascade evaporators — *Muskegon Iron Works.*
Hot process water softener — *Cochrane Corp.*
Turbo-generators — *General Electric Co.*
Cyclone separators — *Western Precipitation Co.*
Redler conveyors — *Stephens-Adamson Co.*
Absorption towers — *G. D. Jenssen Co.*
Heat exchangers and stainless steel fittings—*Electric Steel Foundry Co.*
Stock and liquor pumps — *Bingham Pump Co.* and *Worthington Pump & Mfg. Co.*
Stainless steel tubing — *Northwest Copper Co.* and *Alaskan Copper Co.*



Producers of
SULPHUR
Large stocks at our mines make possible prompt shipments
Uniformly high purity of 99½% or better
Free of arsenic, selenium and tellurium
TEXAS GULF SULPHUR CO. INC.
75 East 45th St. New York 17, N. Y.
Mines: Newgulf and Moss Bluff, Texas

## Visit Ontario Plant

THOROLD, Ont.—Modern methods of newsprint production were inspected at the plant of the Ontario Paper Co., Ltd., on October 21 by about 50 members of the Niagara peninsula branch of the Engineering Institute of Canada. Technical men from the entire peninsula and some from Buffalo, N. Y., made the tour as part of their fall program of meetings and educational visits to plants.

The Ontario Paper Co., recently boosted production to more than 600 tons of newsprint daily by a continued program of increasing efficiency and improved methods. This was achieved without the installation of additional machinery and was credited to loyalty and efficiency of the 1,200 workers of the company.

## Engineers Visit Crane

DALTON, Mass. — Approximately 50 members and guests of the Western Massachusetts Section of the American Institute of Engineers were conducted on a tour of the Crane Paper Mill on October 21. A dinner and symposium followed at the Irving House.

Speakers at the symposium were J. J. Carroll, assistant chief engineer of the Chemipulp Process Inc., who discussed the manufacture of sulphite pulp; Frank H. Williams, general superintendent of the Crane Co., who spoke on the manufacture of rag paper; and Robert Mosher, technical director of the Marvellum Co. of Holyoke, whose subject was the converting of paper.

## Risen From Ashes

CHICAGO — On October 27, nine months to the day after the complete destruction of its plant by fire, the Rittenhouse Paper Co., which markets Certified cash register, adding machine and Teletype rolls, completed the construction and re-equipment of its new building at 6405 South Wentworth Avenue. The company also rewinds and sheets paper for the printing and paper trades.

As its new president, the corporation has elected Robert S. Berger, formerly vice-president of McKenna & Phelps, Inc., New York City paper converter. George Nelban continues as treasurer and production superintendent.

## Hally Joins Texcel

JERSEY CITY, N. J.—A. A. Hally has been appointed sales manager in charge of Texcel sales of the Industrial Tape Corp. Previously Mr. Hally was with the Dennison Mfg. Co., for 23 years.

## Alfrejd Joins Fox

CHICAGO—Norman D. Alfrejd, who recently joined the Fox Paper Co., will, in addition to representing Fox products in the Chicago area, train the firm's men in industrial packaging.

## Staley Personnel Changes

DECATUR, Ill.—H. L. Vandenberg, who heads the paper mill field sales staff of the A. E. Staley Mfg. Co., reports that Carl Gehring has been transferred from the New York state territory to the Ohio territory. Succeeding Mr. Gehring in New York state is Gordon White who will be an assistant to Ray Kilty, whose northeastern territory includes New York state and New England. Robert Schwandt, a chemical engineer with the company since 1945, has been transferred to the paper mill sales force representing the company in the Wisconsin-Michigan-Minnesota territory. James J. Turek, Jr., who has recenty joined the paper mill field staff, will work chiefly on the west coast.

## Awarded Legion Citation

BATTLE CREEK, Mich. — The Clark Equipment Co. has been selected by the National Executive Committee of the American Legion to receive its annual citation as the outstanding employer in Michigan for giving "exceptional service in the employment of veterans, both physically able and disabled or handicapped." All four of the Clark plants — Battle Creek, Buchanan, Berrien Springs and Jackson — are covered by the award.

## Paper Stocks of Asbestos

OTTAWA—Canadian producers' shipments of paper stocks of asbestos during August this year dropped to 7,654 tons compared with 8,073 tons in August a year ago and declined to a total of 53,309 tons in the first eight months of 1948 as against 56,090 tons in the corresponding period last year, the Division of Census of Industry and Merchandising of Canadian Government reports.

## Kreole Mill Picnic

PASCAGOULA, Miss.—Employes of the International Paper Co. Kreole mill held their annual picnic at Cumbest Bluff, October 21. In addition to employes of the company's other mills at Panama City, Fla., and Mobile, there were a number of guests invited from among the businessmen of Pascagoula and Moss Point.

## Carpenter Paper Expands

The Carpenter Paper Company of Kansas City will enlarge its Dallas branch office as soon as construction on the southeast corner of Pittsburg and Levee streets in the Trinity Industrial District has been completed.

## B. & B. Distributor

NEW YORK—W. Mason Wetzel, president of Herbert A. Post, Inc., reports that his firm has been made a distributor for Bauer & Black industrial adhesive tapes.

## Commerce Names Wucher

TOLEDO, Ohio—The Commerce Paper Co., 38-40 North St. Clair street, has named Lou Wucher as sales promotion manager.

## Spanish River Case Appeal

TORONTO, Ont.—Kalamazoo Vegetable Parchment Co., has appealed to the Ontario Appeal Court, headed by Chief Justice Robertson, denying pollution of the waters of the Spanish River. In an action brought by riverfront owners at Sudbury last April, Chief Justice McRuer awarded damages against the company to a total of $5,600. An injunction was also granted which restrained the paper company from discharging any foreign matter into the waters of the river.

## Soda Ash Cut 95 Percent

NORTH TONAWANDA, N. Y.—J. Wesley Youngbirth, manager of the local plant of the International Paper Co., Tonawanda Island, disclosed that 95 percent of the soda ash at the plant has been eliminated by the installation of a precipitator. The precipitator was installed at a cost of $250,000 in response to demands from the Common Council that the soda ash thrown off from the company' high smoke stack be eliminated.

## Welsh Succeeding Ward

WASHINGTON — Retirement because of age, of Jay Ward, who has been in charge of the naval stores conservation program of the Forest Service since 1936, was announced by the Department of Agriculture last week. Mr. Ward will be succeeded by William Welsh, assistant supervisor of the program, whose headquarters have been at Valdosta, Ga.

## Manufacturing A Prospect

COLUMBUS, Ohio—"How to Manufacture a Prospect," was the subject chosen by A. Ellis Frampton, manager of advertising and sales development for the Hammermill Paper Co., Erie, Pa., when he spoke to the Advertising Club of the Chamber of Commerce at the Fort Hayes Hotel recently.

## Pratt Governor-General

BOSTON — Walter Merriam Pratt, head of the Pratt Paper Co., was elected Governor-General of the Society of Mayflower Descendants at the 18th general congress of that body held recently at the First Church in Town Square at Plymouth, Mass.

## Newton Firm Incorporated

NEWTON, Mass.—Addison Associates, Inc., 634 Commonwealth avenue, has been incorporated to deal in paper and paper products, etc., with 300 npv shares. George A. Kuhn is president and treasurer and Gurth I. Abercrombie, clerk.

## Fire Levels Camp 123

FORT WILLIAM, Ont.—A fire which levelled Camp 123, operated by the Great Lakes Pulp & Paper Co., 40 miles west of this city, caused damage estimated in excess of $20,000, W. Bruce Southon, woods manager, reported.

# Hydrafiner Treatment of Rag Stock

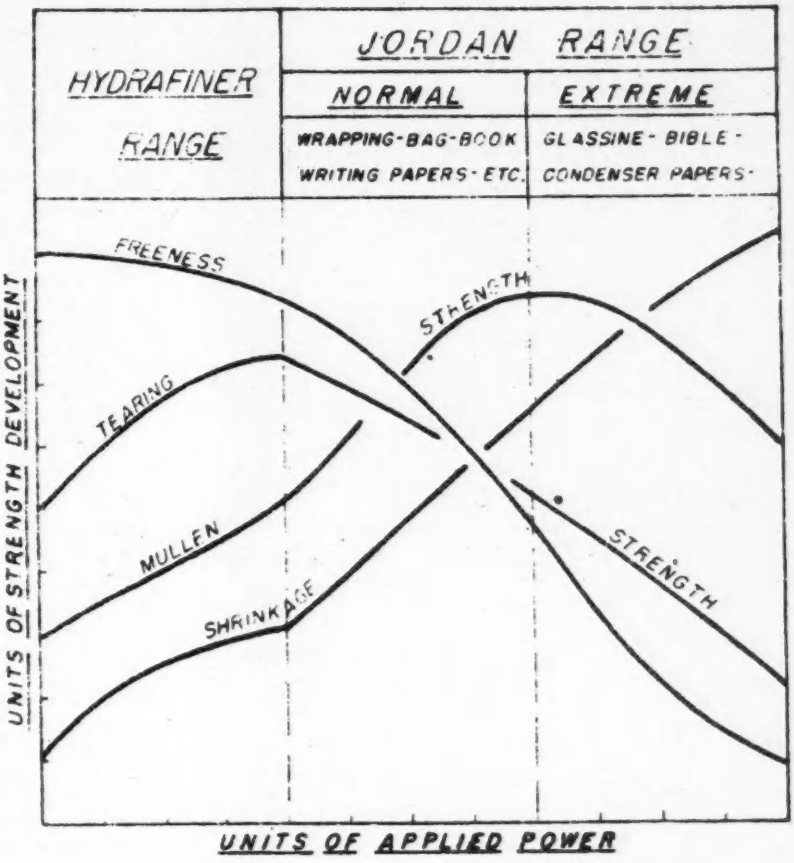
By RAYMOND P. MCGINLEY

Sales Engineer, Dilts Machine Works—Division Black-Clawson Co., Inc., Fulton, N. Y.

Papermaking from rag fibers originated in China and the knowledge of the processes employed spread westward across Europe, eventually reaching America in 1690 but it was not until about 1800 that the industry obtained a firm foothold in this country. Originally very crude methods were employed to convert the rags into paper. This involved washing and steeping in enclosed vessels until fermentation took place, thereby reducing the original rags to a pulp which, upon dilution, was made into sheets on a hand mould. The use of stamping rods eventually was introduced into the industry to such an extent that this was the process in use in practically all mills previous to 1750. The stamping rods were generally run by water power and operated on washed rags in vessels partially filled with water. By this method, only about 100 pounds of rags could be reduced to pulp in a 24 hour day in a typical mill.

About 1750 the original Hollander Beater was developed and by 1800 was in general use in the country. The introduction of the beater was the first decided change in stock preparation equipment. It resulted in improved quality and increased production, and made possible later rapid growth in the industry. However, since the advent of the Hollander Beater, no marked changes have occurred in the method of stock preparation of rag fibers for the manufacture of high quality papers and today beating cycles from four to 24 hours are still required in finishing beaters to draw out the fiber properly. Such lengthy processing limits production and causes high operating costs with a consequent high cost of finished papers.

However, during the past two years the Dilts Machine Works has carried out much experimental work designed to improve this condition. This experimental work has now passed from a trial stage to mill production, and success to the extent of a 60 percent reduction in power consumption and a 75 percent reduction in operating time has been achieved while producing a 100 percent rag sheet with equal strength characteristics and slightly better formation than obtained on sheets from similar stock prepared by the old method. This great improvement in the method of preparation of rag stock and the attendant savings are the result of the proper application of a high speed refiner known as the Hydrafiner.




TYPICAL HYDRAFINER--JORDAN APPLICATIONS AND PERFORMANCE CHARACTERISTICS

Figure 1

Although I believe that you gentlemen are acquainted with the general design of a Hydrafiner, I will give you a description in order to correlate our thinking. The Hydrafiner as shown in Figure 2, is a conical plug type refiner with cast liners of 12-14 chrome steel for plug and shell. The Hydrafiner is not unlike a Jordan in shape but in general, the bars are much wider in the Hydrafiner and the standard rotational speed is 1200 RPM or a peripheral velocity at the large end of the plug in the vicinity of 5500 F.P.M. We believe that the high plug speed, in connection with other factors, imparts certain necessary qualities of "hydration" to paper stock of all kinds, rag as well as wood pulp.

Reference is made here to Figure I which indicates the type of treatment in terms of strength development which may be expected from combina-

A paper presented at the Fall Meeting of the Connecticut Valley Division of the American Pulp & Paper Mill Superintendents Ass'n., Inc., held at the Sheraton Hotel, Springfield, Mass., October 30, 1948.

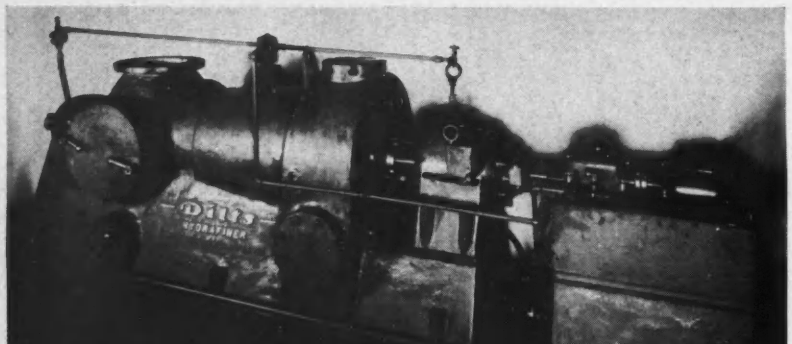


Figure 2—Hydrafiner

tions of Hydrafiners and jordans under different conditions of applied power. In the Hydrafiner range, a comparatively small freeness drop is accompanied by an increase in tearing strength, rapid Mullen development and an increase in shrinkage. At the end of Hydrafining, the resulting stock is comparatively free and relatively long fibered as indicated by the small drop in freeness with the development and retention of tear while the increase in mullen and shrinkage is attributable to the splitting and bruising of the fiber with a minimum of cutting to produce what is generally known as hydration. With the passing of the stock to the jordan range, the type of treatment changes markedly with a continuing increase in bursting and tensile strengths but a sharper decrease in freeness and a change from an increase to a decrease in tear. This change occurs because the primary function of the jordan is to cut the fiber with closing of the sheet resulting from decreased fiber length. As the jordan treatment continues eventually the increasing shortness of the fiber offsets the increase in strength accruing from the closer formation of the sheet and a decrease in mullen ensues. The slopes of the curves shown in Figure I vary depending on the type of stock processed but, in general the trend of the stock development in relation to the applied power during Hydrafiner-jordan operation is well illustrated. Our work has indicated that the general trends shown by Figure I apply to rag stock and, although some modifications were necessary to enable it to cope with the long rag fibers, the stock characteristics developed by the Hydrafiner as indicated have paved the way for its successful operation on rag stock.

Our first installation of a Hydrafiner to operate on rag stock occurred during the modernization program of a prominent rag paper mill when they, full well realizing the excessive power and time consumed in their old type of beating equipment, were searching for some better means of stock preparation. Originally, this mill had several beaters and washers furnishing the stock for their paper machines. The grades of paper manufactured are of a high quality consisting of bond, ledger and bank note papers, most of which have some rag content. As usual, in the preparation of rags, the rag boilers discharge the cooked rags to the floor from where they are carted to the washers for approximately four hours treatment previous to dropping to the drainers preparatory to beating. Reasoning indicated that if the tackle in the washers was sharpened somewhat, actual beating could be imparted to the stock in the washers. It was at this point that refining was desired by means other than by beaters, if possible, in order to increase the production and retain the quality of stock and, for this purpose, a Hydrafiner was installed on an experimental basis. The Hydrafiner installed was a standard 1,200 RPM No. 1 size unit driven directly by a 250-HP motor and fitted with a 68-bar herringbone shell liner and a modified 52-bar plug liner. The plug liner, originally containing 26 long bars and 26 short bars, had been modified by having all the short bars removed, thereby giving a free flow through area in order that the long fibered rag stock would be able to pass through without hang-up or dewatering and, in addition, to facilitate this operation, all leading edges were rounded off and everything done to make the inlet streamlined.

A diagrammatic sketch of the mill layout as shown in Figure 3, indicates that this Hydrafiner was connected to an ordinary beater for cycling. In operation, the stock was dropped to the Hydrafiner from the side of the beater opposite the roll with about a 20-foot head on the Hydrafiner and then was pumped up to a location about four feet from the drop hole still on the side opposite the roll in the beater. During cycling operation, a board was installed in the beater channel between the inlet to and the outlet from the Hydrafiner so that no bypassing of the stock occurred. Circulation carried all of the stock around the beater tub and down into the Hydrafiner. In addition, in order to be able to run a complete supply of Hydrafined stock on the machine at one time, another beater was tied into the system in such a way that the stock could be dropped to the Hydrafiner and circulated through the first beater. Also, in order to be able to dump the stock, a discharge line to the jordan chest was hooked on the line leading from the Hydrafiner back to the beater. Although this installation is not rated as the best type for optimum operation, in this case it was recognized as the one most satisfactory for experimental operations.

The original excessive length of the rag stock as supplied by the present washers apparently precluded the use of the Hydrafiner on this type of stock without some further previous treatment. Our desire was to be able to handle the stock in the Hydrafiner with approximately two or three hours prebeat on the stock in a finishing beater after washing, thereby giving us the equivalent amount of time and fiber shortening as would be produced by the washers with sharper tackle. With this idea in mind several trial runs were made with the usual number of failures and difficulties attendant to development work but in the end, success was finally achieved with a large reduction in processing time and power.

In the first trial, the rags used were a No. 1 muslin and had been washed with some roll setting for approximately five hours before being dropped to the drainers. This stock was then furnished to a finishing beater for further cutting. The standard preparation of these rags consisted of approximately ten hours beater treatment after washing and on our first trial, we tried to drop the stock to the Hydrafiner with two and one-half hours prebeating in the finishing beater. Unfortunately, due to poor manipulation of the Hydrafiner, the stock dewatered at the large end and the Hydrafiner shut down. In order to be on the safe side after this experience, seven hours of beating was given the stock as a starting point in the next trial before processing it in the Hydrafiner. During these first trials, the beating cycle was cut down progressively to approximately four hours but the Hydrafiner would not do any cutting on the stock, although slowing it up tremendously with a resulting mottled formation on the machine wire even with a higher jordan setting. The results of tests made on this stock are very indicative of the type of action that occurred as shown under Test 1 on Figure 4. Note that, although the freeness dropped from 409 c.c. to 317 c.c. Canadian

standard, there was no drop in the percentage of fiber retained on a 20-mesh screen after 35 minutes Hydrafiner treatment, indicating no reduction in fiber length.

Our first reaction to these results was that the bars were, no doubt, too wide, suplying too much hydration with a minimum of cutting and, therefore, the first change that was made was the removal of 3/16" from the widths of each of the 26 bars. Originally the bar width was of a tapered type ranging from 23/32" at the large end of the plug to ½" at the small end of the plug. With the reduced width, the bar width then varied from 17/32" at the large end of 5/16" at the small end. Further tests were run after this change was made on a furnish of 50 percent rag bond but, even on this comparatively weaker type of stock, the original difficulty of too much hydration and too little cutting occurred as is very evident by noting Test 2 on Figure 4. This test indicates a slight drop from 66 percent to 61 percent of the fiber retained on a 20-mesh screen after 20 minutes Hydrafining, but the drop from 611 c.c. to 511 c.c., Canadian standard freeness indicated an excessive freeness drop in comparison to the amount of fiber shortening. The Hydrafiner still was not doing much actual cutting of the stock.

In both of these tests, it was noted that the 250 HP motor driving the Hydrafiner was running overloaded at almost 300 HP and there still did not seem to be enough power to cause the close intimacy of the liners necessary to give the cutting desired to the stock. Since there appeared to be a tremendous amount of circulation and pumping ability supplied by the Hydrafiner, it was reasoned that, by cutting down on the amount of stock circulated by the Hydrafiner, enough additional power would be available to move the liners into closer intimacy and thereby cut the stock. Accordingly, after the start of the next trial, the valve on the inlet side of the Hydrafiner was closed 60 percent and immediately a drop of 50 HP occurred at the same refiner setting and a reduction of slightly over one-third took place in the volume of stock pumped by the Hydrafiner. When the Hydrafiner plug was reset to its former setting of approximately 290 HP, the effect on the stock treatment was immediate with fiber cutting starting. After 20 minutes cycling through the Hydrafiner, the stock appeared ready for the machine, having the feel that indicated the proper amount of cutting and hydration. When the stock reached the machine no changes were required and paper comparable to that made from beater prepared stock resulted. These changes are immediately noted by checking Test 3 on Figure 4 which shows a drop from 579 c.c. to 423 c.c. Canadian standard freeness and a drop of from 59.8 percent to 48.3 percent of the fiber retained on a 20-mesh screen. This is the first test where the drop in freeness was accompanied by a comparable drop in percentage of stock retained on a 20-mesh screen.

Full well realizing the difficulties that might be encountered by running a Hydrafiner with the inlet throttled,

MILL LAYOUT
SHOWING HYDRAFINER HOOKUP

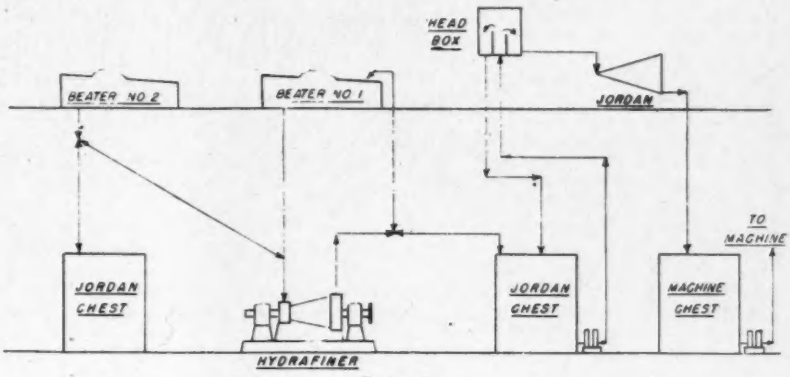



Figure 3

## FIGURE 4—FIELD TRIALS

**Hydrafining Rag Stock**

| Test Series | Furnish | Beater Treatment (Hours) | Hydrafiner Treatment (Minutes) | HP/T/D Beater | HP/T/D Hydrafiner | HP/T/D Total | Freeness Can. Std. (cc) | Fractionation % Retained 20 Mesh | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | 100% rag | | 0 | 37.0 | 0 | 37.0 | 409 | 51.3 | |
| 1 | #1 quality | 6.5 | 10 | 37.0 | 3.7 | 40.7 | 359 | 49.3 | Plug bars standard. |
| | | | 35 | 37.0 | 12.8 | 49.8 | 317 | 54.9 | |
| | 50% rag | 4.0 | 0 | 22.8 | 0 | 22.8 | 611 | 66.2 | Plug bars narrowed 1/16". |
| 2 | 50% sulphite | | 20 | 22.8 | 7.8 | 30.6 | 511 | 61.2 | |
| | 50% rag | 4.0 | 0 | 22.8 | 0 | 22.8 | 579 | 59.8 | Inlet valve 60% closed. |
| 3 | 50% sulphite | | 25 | 22.8 | 9.6 | 32.4 | 423 | 48.3 | |
| | | 9.5 | 0 | 54.0 | 0 | 54.0 | 263 | 36.6 | Completely beater treated stock. |
| | 100% rag | | 0 | 14.2 | 0 | 14.2 | 672 | 73.0 | Discharge valve 75% closed. |
| 4 | #1 quality | 2.5 | 10 | 14.2 | 3.6 | 17.8 | 620 | 66.8 | |
| | | | 32 | 14.2 | 11.4 | 25.6 | 542 | 60.0 | |
| | | 12 | 0 | 68.2 | 0 | 68.2 | 275 | 24.0 | Completely beater treated stock. |
| | 100% rag | | 0 | 14.2 | 0 | 14.2 | 630 | 71.2 | Hydrafiner liners redesigned. Discharge valve open. |
| 5 | #1 quality | 2.5 | 15 | 14.2 | 5.3 | 19.6 | 521 | 55.8 | |
| | | | 29 | 14.2 | 10.2 | 24.4 | 445 | 47.1 | |

## FIGURE 5—PHYSICAL STRENGTH COMPARISON

**100% Beaten Stock vs. Prebeaten and Hydrafined Stock**

| Test Series | Type Refining | Laboratory Manufactured Sheets % Mullen | % Tear | % Tensile | Machine Manufactured Sheets % Mullen | % Tear | % Tensile | Avg. Fold |
|---|---|---|---|---|---|---|---|---|
| 5 | Stock 100% beater treated for 12 hours | 87.4 | 293.0 | 19.2 | 116.0 | 273.0 | 40.4 | 1924 |
| | Stock beaten for 2.5 hours and Hydrafined for 29 min. | 84.3 | 321.0 | 19.3 | 110.0 | 270.0 | 35.8 | 1784 |

## FIGURE 6—POWER AND REFINING TIME SAVINGS

**Beater-Hydrafiner Cycling Refining Methods vs. Beater Refining Only**

| Test Series | HP/T/D Beater | HP/T/D Beater & Hydrafiner | Power Savings(%) | Total Hours Treatment Time Beater | Total Hours Treatment Time Beater & Hydrafiner | Time Savings(%) |
|---|---|---|---|---|---|---|
| 5 | 68.2 | 24.4 | 64.3 | 12 | 2.98 | 75.2 |

possibly causing bar-to-bar contact because of lack of stock, it was decided to run a trial operating the refiner with the discharge valve throttled and investigate the action of the Hydrafiner on stock in this manner. This trial was run on a beater of No. 1 rags and it was noted that, with the discharge valve throttled approximately 75 percent and with the flow-through cut down approximately 50 percent, it was possible, using 290 HP to 300 HP, to obtain enough intimacy between the plug and shell liners to cut and hydrate the rag stock properly. After approximately 30 minutes Hydrafining, stock that had been prebeaten for two and one-half hours was run over the machine, producing a grade of paper comparable to that previously made by beater treatment alone. Note Test 4 on Figure 4, which gives the tests on a sample of finished stock completely beater treated for nine and one-half hours in addition to figures derived from the same type of stock after prebeating, after ten minutes Hydrafining, and after 32 minutes Hydrafining. These figure indicate a drop from 672 c.c. to 542 c.c., Canadian standard freeness with a drop of from 73 percent to 60 percent of the fiber retained on a 20 mesh screen. In addition, these tests indicate, as is usually the case, that beaten stock is much shorter and has a lower freeness than Hydrafined stock.

At this point, although we were able to obtain the bar intimacy required to cut the stock, the power consumption still exceeded the motor rating. In order to cut down the power requirement of the Hydrafiner in this installation, it was decided to remove half the length of the bars starting at the small end of the plug. This was done with all sharp edges being tapered down. The plug was reinstalled and, because less power was used for pumping and circulation of the stock due to lessened pumping ability with the shortened bars, more power was available for refining, no throttling of the discharge valve was necessary, greater intimacy of the bars on the plug and shell occurred, and the Hydrafiner cut and hydrated the stock properly so that it ran on the machine with practically no change in any machine or jordan setting. A noticeable factor during these tests was that the power had been cut from approximately 300 HP to 250 HP and thereby kept within the motor rating. By means of using the second beater of stock, a 6 hour run of paper was made with Hydrafined stock on the machine using a two and one-half hour prebeat in the beater on No. 1 rags and using a cycle of approximately one-half hour in the Hydrafiner. The results of these tests are shown under Test 5 on Figure 4. This test also contains results on stock manufactured in the standard method by beating for 12 hours in the finishing beater and this stock is compared with the Hydrafined stock. Note that the Hydrafiner reduced the freeness from 630 c.c. to 445 c.c., Canadian standard with a shortening of fiber from 71.2 percent to 47.1 percent of the fiber retained on a 20-mesh screen in one test and, in another equivalent test, the freeness was reduced from 585 c.c. to 344 c.c., Canadian standard with a reduction from 67.8 percent to 42.7 percent on the percentage of stock retained in a 20-mesh screen. When these figures are compared with the 275 c.c. freeness Canadian standard and 24 percent retained on 20-mesh screen of completely beaten stock, it is evident that the fiber length was quite a bit longer and the freeness higher in the Hydrafined stock than in the ordinary beaten stock.

Since the proof of the pudding lies in the test on the finished paper, samples of standard beater prepared and Hydrafiner prepared paper were tested and compared. These tests showed: percent mullen, percent tear, percent tensile and average fold in cross and machine directions. The results of these tests are given in Figure 5 and show that the beater manufactured sheet had a mullen of 116 percent as compared with 110 percent on the Hydrafined sheet, a tear value of 273 percent on the beater manufactured sheet as compared with 270 percent on the Hydrafined sheet, a tensile value of 40.4 percent on the beater manufactured sheet and 35.8 percent on the Hydrafined sheet and an average fold of approximately 1,900 on the beater stock as compared with slightly under 1,800 on the Hydrafined stock. These differences in test values between the beater manufactured stock and the Hydrafined stock appear to be so small as to be considered negligible and possibly caused by experimental error or differences in original strength characteristics of the fiber. In other words, for all practical purposes we may say that the finished paper prepared from Hydrafined stock is equivalent to finished paper prepared from beater manufactured stock. The improved formation found in the finished paper made from Hydrafined stock as against the formation of paper prepared from beaten stock is in keeping with the history of experience using Hydrafiners on wood pulp. The peripheral speed of the Hydrafiner plug liner exceeds that of jordan plugs and beater rolls by from 2,000 to 4,000 F.P.M., respectively, and this differential may be of significance for evaluating the Hydrafiner in terms of the results produced. For example, it has been noted that the prevalance of rag knots is much less when the Hydrafiner is employed and, in addition, longer and freer fiber may be used on the paper machine wire.

In review, our work with the Hydrafiner in this mill, using the standard washing cycle in the washers, cut the processing time in the beater from approximately 12 to two and one-half hours and only added one-half an hour of Hydrafining to replace the nine and one-half hours saved in the beater. This is apparent from Test 5 in Figure 6 and indicates a time saving of approximately 75 percent which was accomplished with a resulting power saving of approximately 60 percent. Although the Hydrafiner uses 250 HP during its half hour of operation, this is far less than nine and one-half hours operation of a beater at an average of 75 HP under a heavy roll setting. With this improvement noted, one beater-Hydrafiner combination promises to accomplish the work of four beaters, with the 75 percent saving in beater equipment representing an increase of 400 percent in beater output. In addition, the space requirement is greatly reduced and a higher quality sheet is achieved with better formation than previously and with equal strength characteristics.

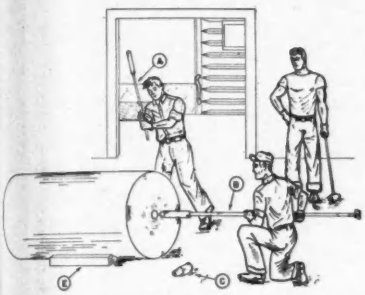
With the completion of these tests, it appears that paper prepared from Hydrafiner treated rag stock compares more than favorably with paper prepared from beater treated stock when considered in relation to formation and strength properties, and that a great saving in time and power consumption is possible through the use of a beater-Hydrafiner combination instead of beaters alone. As a result of this work, a new approach is offered in the preparation of rag stock, and it is evident that a large step forward has been made, quite comparable to the original introduction of the Hollander Beater.

**INDUSTRIAL DEVELOPMENT**

**Paper Trade Journal, in this section, makes space available for discussion of technical and operating problems. Space is also available for the presentation of independent studies and research on technical and engineering subjects. Feature stories of paper mills, converting plants and inter-related industries will be included. An invitation is cordially extended to all who are qualified to discuss these subjects. Original manuscripts submitted exclusively to Paper Trade Journal and found suitable for use in this section will be paid for immediately upon acceptance. Submit manuscripts to E. P. McGinn, Industrial Editor.**

# Method of Restoring Out-of-Round (Flat) Rolls of Newsprint

**By ASS'N OF AMERICAN RAILROADS**



The process of straightening out-of-round rolls of newsprint involves placing the roll on a smooth, level floor or platform and securing it against movement with wood blocks (E) Fig. 1 shows an out-of-round roll of newsprint. A workman then pounds the bilge of the roll along its entire length with a round steel striking bar (A). If desirable, a hardwood board (D) may be placed on top of the roll and pounded with a sledgehammer instead of using the round steel striking bar. It may be necessary to rotate the roll slightly to each side of the original position and again pound the roll. This process is repeated on the opposite bilge of the roll. The blows from the striking bar or the sledge hammer carry through the roll and force the flat surfaces into round. Usually this process is all that is necessary to restore slightly out-of-round rolls.

In cases where the core as well as the roll is out-of-round, the roll is pounded as above described until the core is practically round. A steel mandrel (B) is then inserted into the core and driven through same. As the mandrel is being driven through the core, the roll is pounded directly above its head. This operation is repeated until the mandrel can be freely pushed through the core.

Fig. 1 shows a workman pounding the roll along its top bilge while two other workmen prepare to insert a mandrel into the core.

Occasionally the steel cap that fits over each end of the core is bent to such an extent that the mandrel cannot be driven in. In such case, a wedge (C) is inserted into the core and struck at an angle with a sledge hammer until the cap is sufficiently round to permit inserting the mandrel.

The time required to restore a flat roll varies from a few minutes to approximately an hour, depending on the amount of the flatness and the tightness of the roll.

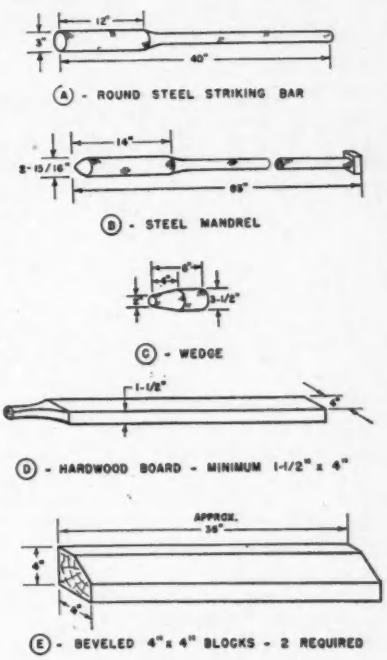



Figure 2—Material used.

# College-Industry Relations

***—With Reference to Placement and Orientation of Mechanical Engineering Graduates***

**By S. H. GRAF**

**Professor of Mechanical Engineering and Director of Engineering Experiment Station, Oregon State College, Corvallis, Ore.**

A comparison of mechanical engineering curricula offered by the engineering colleges of the United States discloses that in its essentials the pattern of mechanical engineering training during the past fifty years has changed but little. This is a startling statement with which many will differ and perhaps some justification and explanation is in order. The core of the mechanical engineering curriculum now consists, as it did in the early 1900's, of a groundwork in mathematics, physics, chemistry, drawing, shops, mechanics, materials, hydraulics, electricity, and thermodynamics together with various courses designed to accomplish the student's general education such as English, government, sociology, and economics. This core of fundamentals has been variously augmented by a very wide selection of specialized subjects differing somewhat between institutions in accordance with local needs and special interests of the faculties.

In the early days, 40 or 50 years ago, the scope of engineering information was very limited as compared to the present. Let us take just the field of materials alone. Fifty years ago the American Society for Testing Materials was just getting under way and all of their standards at that time made a book just about an inch thick. At present there are three books of standards each about three inches thick. The students were taught about wrought iron, cast iron, two or three grades of steel, brass and bronze, wood, stone, and two kinds of cement —Portland and natural. High-speed and other alloy steels were just in the experimental stage. There is no point in elaborating the difference between then and now, as

Presented at the 1948 Fall Meeting of the American Society of Mechanical Engineers, September 8, 1948.

every engineer knows how materials for specialized purposes have multiplied and how many entirely new basic materials have been developed. The same comparison could be made in every other division of knowledge with which the mechanical engineer must deal. This expansion of the field of mechanical engineering has brought about our many professional divisions and likewise the development of a number of specialized curricula in the departments of mechanical engineering of the colleges.

Parallel with the technological advancement just outlined there has also been a very marked change in faculty-student relations. The older engineers present will remember that in their day it was the tradition that the faculty should hold itself aloof from the students and surround itself with a quite impenetrable mantle of dignity. Faculty members of course still aim at a dignified bearing but have remembered to realize that students are human beings with the same hopes and ambitions that they themselves have or at least had. In the old days colleges quite generally took the attitude that when the senior received his diploma their responsibility had been completely discharged. It is quite different now, and while the college does not guarantee the graduate a position, provision is generally made either through an organized personnel department or through the less formal activities of departmental staff members to help the senior in his placement problem. Industry itself is largely responsible for this change in attitude. Forty or fifty years ago the college-trained engineer was still somewhat of a rarity in industry and was viewed with misgivings. There were few industrial executives with a background of college training in engineering, and the appreciation of the contribution that the engineering graduate could make to industry was slow in coming, particularly in some of the distinctly mechanical engineering industries. At present industry looks to the engineering colleges for its future executives, for research men, for designers, and for specialists of all sorts. During the past fifteen years or so, even including the depression years, the number of industries regularly sending interviewers to the engineering colleges has seen a constant increase. The self-made engineer now is more rare than the college-trained one was in 1900 and is becoming almost an impossibility.

Since now a definite customer-seller relationship exists between industry and the engineering colleges, we have several quite definite responsibilities as employers and as schools respectively in absorbing and preparing those to be placed. Naturally industry is concerned that the graduates should fit its needs, and it is obvious that a placement to be successful must be satisfactory to both the graduate and his employer. In order effectively to cooperate with interviewers, the department head or personnel officer must know his product and it is essential that all staff members should have some understanding of employer needs and the conditions existing as regards kind of work, prospects of advancement, salaries, and so on in the different industries where their students find employment. Interviewers of course can help in many ways to provide this information and students are not slow in rating interviewers. Some of them do an excellent job and others perhaps due to lack of experience and proper instructions from company officials fall far short of the ideal and not infrequently leave the campus without a single recruit.

We come now to a question which has had a tremendous amount of discussion during the last few years. In general the question is, what does industry want? Because of the pressure of technological advancement there has been a gradual tendency to expand the technical content of curricula more and more and since there is only so much time available, this has been at the expense of the non-engineering subjects, languages, literature, history, and in general the humanities. The typical curriculum of 1900 allowed a liberal proportion of time for these subjects which all agree are important in a general, well-rounded education. A few years ago a committee of the American Society for Engineering Education on Engineering Education After the War presented a comprehensive report urging a liberalizing of engineering curricula and recommending that a minimum of 20 percent of the curriculum content be devoted to the humanities. This proposal has received much publicity not only in educational circles but in the technical press as well, including Mechanical Engineering, our own publication. Most schools have made an attempt to meet the proposed requirements although the response is certainly not unanimous and generally falls short of the 20 percent suggested. A few schools have solved the problem to their own satisfaction by going to a five-year curriculum for the Bachelor's degree, a solution which in general is not very satisfactory to the students as it means an additional year in college for the taking of subjects in which they have little interest. Unfortunately, the appreciation for subjects like literature, history, sociology, and economics does not develop in a man until he is more mature and finds that knowledge of these fields is important to him in his work and in his relations with people.

Let us go back to the questions of what does industry want, or rather what does industry say it wants, and what does it employ? What are the best selling points of a graduate when he is seeking a position? A few years ago the speaker, being concerned with curriculum revision, wrote a letter to about a dozen of the personnel directors of our leading industries calling attention to the recommendations of the ASEE Committee and asking their comments and discussion as to what industry would prefer to employ; namely, men who were trained in a number of the somewhat specialized fields of its activities but with a minimum of the so-called humanities, or men who were trained in only the fundamentals of engineering together with a more expanded training in the liberal subjects. The response varied from one extreme to the other and about half of these authorities very definitely stated that the present product was quite satisfactory and that no drastic change should be made. Others stressed the point that more attention should be given to training in "fundamentals" but unfortunately only a few made any attempt to define what they meant by fundamentals. Our experience at Oregon State College, corroborated by reports from a number of other heads of departments of mechanical engineering, indicates that when a student is definitely seeking employment in a certain industry his best selling point aside from general considerations of personality is at least some preliminary training in the specialized field of that industry. In saying this there is no thought of belittling or minimizing the value of the humanities but only a realization that before a student gets much out of a subject there must be the motivation of interest. Some students of course are interested in cultural activities such as debating, drama, music, art, or the humanistic subjects. There is nothing to stop such a student from electing such courses and taking five years for his BS degree. There is also the possibility that a

four-year student with such interests may return for graduate work for his MS degree and spend as much as one third of his time pursuing humanistic courses as a minor.

The difference in viewpoint on the part of industry no doubt is dictated somewhat by the contemplated destiny of the graduates it hires. Some of the interviewers are primarily interested in men who will develop into technical specialists while others definitely are looking for men who after a period of training and the necessary years of experience will emerge as executives. Those who are looking for men for the latter purpose are more interested in appearance, personal traits, and a broad attitude in their selections, while the former usually are interested in the high grade-point man who gives promise of becoming a real expert in a specialized technical activity. It is interesting to comment at this point that in a recent survey of the thousand or so graduates from the speaker's own department there is little correlation between grade-point average and after-graduation success, at least as measured by monetary standards.

During the war the engineering colleges were practically depopulated so far as regular men students were concerned, but in most institutions the deficiency was more than made up by trainees under the Army Student Training Program. Most of the engineer trainees were in mechanical, electrical, and civil engineering pursuing intensive curricula giving them the more practical essentials but leaving out all normal trimmings. The educational program for veterans since the war coupled with the desire of many of the ASTP trainees to complete their education has accounted for the large numbers in engineering schools during the past two years. The number of 1948 graduates from the 164 principal colleges of the United States was 151,045. Of these, 80,451 were veterans which is an increase of about 58 percent over those graduating in 1947. It is estimated that 1949 may be the peak year for veteran graduates and that after that there will be a rather sharp decline. The situation of the last two years, and to a decreasing extent continuing for several years, brings about an important difference in the characteristics of the current engineering graduates. The veteran graduates will average some three or four years older than is usual and approximately one-half of them are married, many with children. Whereas formerly the typical graduate was young, inexperienced, and eager for adventure, these older men have been through a lot and many have traveled all over the world, consequently, their attitude is far more critical and they are much more inclined to question things as they are and to be more concerned with such questions as where they are going to live, what security they will have in a position, what salary, and what prospects for advancement. This is quite understandable as they are not only concerned with themselves as individuals but already have heavy family responsibilities which they must be assured they can meet in any position they may accept. Industrial interviewers therefore have a somewhat different problem confronting them and must not be surprised if a prospective recruit among his first questions will ask about the retirement program of the company. Very likely the man has grown up under the ideas of the New Deal era and has spent few if any of his thinking years under any other regime. After that, he was in the military service where he did what he was told and was completely in the hands of his Government.

The broader experience and outlook of the veteran graduate, many of whom have been commissioned officers with heavy responsibilities, in general should be an advantage and of value to the employer, however, the veteran may be a little out of phase with his normal age group so far as engineering experience is concerned and this should be taken into account in the training programs of the industries. A more intensive training schedule is indicated and earlier granting of responsibility wherever this is possible would be most encouraging to the men and often good business.

Harking back to the pre-war influences on the young men and the present disappointingly unsettled state of world affairs, it is not surprising that many college students now are much more willing to give ear to ideologies foreign to the traditional American way of thinking. Engineers, generally speaking, are a conservative lot and this applies to instructors as well as to engineers in industry. The engineer as a student is largely occupied with more or less abstract technical and scientific principles and there are few of his courses which cover the financial and economic affairs of the career for which he is preparing himself. Some departments of mechanical engineering require of their seniors a course that might be called an orientation course to industry, although designated by a variety of names such as production management, industrial engineering, and so on. For such courses the instructor should be a mature engineer with actual industrial experience and a broad viewpoint together with rather specific knowledge of the products made by and the conditions of employment in the industries commonly served by his institution.

Obviously only a small part of the desirable indoctrination can be accomplished by the department in such courses as just mentioned. Many industries have excellent training programs, but these are concerned primarily with the technical phases of the business. An opportunity would seem to exist here for easing the road of the new engineering recruit by giving him more general information on the company, its organization, avenues for advancement, and other matters concerned with personal interest and welfare. The speaker has often received very discouraged letters from his graduates after they have been employed for a few months and these usually indicate that no one has taken any interest in the young man's welfare or future. The statement is reiterated that a placement cannot be successful unless it is mutually satisfactory and profitable.

In many situations young engineers are greatly concerned with the question of affiliation with this organization or that. Most engineering graduates view themselves as professional engineers in the making and wonder what they should do about pressures that are brought upon them with respect to labor union affiliation. Those who are employed with the definite objective of becoming executives most likely will from the beginning feel themselves a part of management and consequently have no desire to join a labor organization of the usual type. In some industries definite provision has been made to meet this situation, however, in others it is a very difficult and puzzling problem to the young engineer in the solution of which he would ardently welcome any assistance. All forty-eight states of the United States now have registration laws and many of the colleges are acquainting their seniors with the provisions of such laws. An engineer who is looking forward to professional status needs recognition of this fact and should be encouraged to register as soon as he can qualify, and even more, to associate himself with his professional society. Especially if employed away from home in a new and strange state, he needs information and encouragement in these matters. Many industries have a very generous policy with

respect to attendance at meetings and in program participation on the part of their engineer employees. This is especially true of the larger industries, but the young engineer who takes a position with a smaller company may often find himself quite lost at first until someone invites him to an ASME meeting or to some other technical activity.

Industry has a vital stake in the engineering colleges not only in maintaining current operations but more particularly with respect to the long future. This thought would hardly be questioned but in the rush of pressing tasks is often forgotten. The busy executive worrying about production quotas, how to get needed materials, with plant expansion, and many other things does not find time to think much about the problems of the college departments where he expects to obtain his future lieutenants. Close contacts and cooperation with industry are highly essential to every college engineering department and it was the hope of the speaker in preparing this paper that it would not only bring to the attention of engineering executives some of the problems of placement and orientation of the new graduate but also to point out some of the ways in which contacts and closer cooperation could be brought about. Time is too short to fully elaborate the various possibilities but the following might briefly be mentioned: (1) The supplying of literature, films, and occasional lecturers, (2) The supplying of materials for laboratory tests and small research projects, (3) Laboratory equipment either by donation or at bare cost price, and (4) The support of fellowships.

It is perhaps too much to expect that all industries could broadcast such assistance, as this would be too costly. However, those industries taking considerable numbers of men from certain schools could well afford as a matter of self-interest, to see that these schools are adequately equipped. A number of the large industries now have very liberal policies with respect to several if not all of these suggestions. The Aluminum Company of America and the International Nickel Company have contact men who visit the engineering colleges and invite requests for materials needed in laboratory tests and experimental projects. The General Electric Company, Westinghouse Electric and Manufacturing Company, and others make generous concessions on equipment purchases and often outright donations for research projects. The Standard Oil Company of California regularly supports a number of graduate fellowships and there are many others who give a wide variety of assistance to schools in their own regions particularly with respect to special lectures and equipment items. Many of the smaller industries having research problems but no laboratories of their own could well afford to set up special fellowships from time to time with the requirement that the holders of such fellowships would use their problems as thesis subjects. This is an especially attractive possibility at present since the number of graduate students in engineering has multiplied many fold over pre-war enrollment.

In addition to physical facilities, and even more important to a strong engineering department, is a live and well-informed faculty. Most instructors are employed for the school year only and many institutions have provisions for sabbatical leaves. It would be most advantageous if more instructors could and would obtain employment in industry during their vacation periods and also during their sabbatical years. This is not impossible now, but with a little encouragement on the part of industry by way of invitations such opportunities would be more generally sought. The stimulation resulting from such industrial contacts is tremendous and its effect in the orientation problem most beneficial.

This discussion, admittedly rambling, has covered some of the problems of a typical mechanical engineering department. These problems are of mutual concern to the department and its customers, and if a department is to serve its students and their future employers in the best way possible, closer cooperation is necessary. The various means of enhancing such cooperation which have been pointed out appear worthy of serious consideration and more active development on the part of industry.

# Literature

*American Management Ass'n.,* 330 West 42nd street, New York 18, N. Y. Pamphlet, "New Directions in Sales Management, Marketing and Packaging." Checklist of publications reporting advances made in these fields during recent years. The 59 publications listed contain expositions and analyses of operating techniques, policy determination, procedures, company case histories, and the technical experience of leading organizations which have pioneered progress in market research, sales compensation, materials handling, container and package testing, sales training and other aspects of distribution. Fifteen of the publications cover marketing, 17 are devoted to packaging, and 5 discuss personnel management. Also listed are production, general management, office management, personnel management and research reports, also special publications pertinent to the development of marketing, sales and packaging management. Checklist available gratis.

*Leeds & Northrup,* 4934 Stenton avenue, Philadelphia 44, Pa. Catalog ND4A(2), "Duration-Adjusting Type of L&N Electric Control." Illustrated with actual installations, the publication describes the D.A.T. method for controlling heat input by supplying electric power (or heat from combustion) in impulses of controlled duration. Shows how the system provides the full benefits of proportional control with automatic droop correction. In addition to Micromax control instruments, catalog lists the Speedomax line of controllers for applications where unusual speed and sensitivity are required.

*Associated Factory Mutual Fire Insurance Companies,* Inspection Dept., 184 High street, Boston 11, Mass. Bulletin, "Fire Safety for Windowless Buildings" (No. 8.24). Covers this increasingly important fire problem more fully. Includes sketches showing suggested arrangements of fire controls for air conditioning systems.

*Forest Industries Council,* 122 East 42nd street, New York 17, N. Y. Booklet, "Forest Industries Council." Presents aims, objectives and relationship of efforts of the council to National Lumber Mfgrs. Ass'n., American Pulpwood Ass'n., and AP & PA.

*Towmotor Corp.,* 1226 East 152nd street, Cleveland 10, Ohio. Booklet, "Towmotor Job Study No. 80." Explains in detail the finer points of modern materials handling techniques and equipment as applied to Bird & Son operation.

*Wheelco Instruments Co.,* 847 W. Harrison street, Chicago, Ill. Bulletin, "Electronic Controls." Contains listing of standard instrument models, also describes and illustrates indicators, controllers, recorders and combustion safeguards.

*O. Zernickow Co.*, 15 Park Row, New York 7, N. Y. Circular, "O-Z Improved Direct Reading Tachoscope and O-Z Improved Tachoscope." Introductory circular for a chronometric tachometer which shows per minute speeds, r.p.m. and f.p.m. in three seconds (Type A) and 6 seconds (Type B); also a precision revolution counter synchronized with a high grade Swiss Stop Watch. Complete specifications supplied with copy and cuts.

*Pittsburgh Plate Glass Co.*, Grant Bldg., Pittsburgh 19, Pa. Booklet, "Color Dynamics, The Scientific Utilization of the Energy in Color to Promote Efficiency in Industry." Deals with one of the *tremendous trifles* which could have a marked influence on a worker's morale or his rate of production — Color. Applied to machines, wall and ceilings, floors and aisles, Color Dynamics as a science aims to promote continuity of employment, to improve efficiency of operation, and to maintain quality of production. Booklet provides specification chart for exterior and interior surfaces and offers free survey of plant painting problems. Companion book to "Color Dynamics For The Home" also available.

*Sindar Corp.*, 330 West 42nd St., New York 18, N. Y. Booklet, "Price-list and Catalog." Divided into five sections devoted to odors for industry: aromatic chemicals, germicides and fungicides, stabilizers and anti-oxidants, and anti-skinning agents. Information on use for each industry and cost for each product is given.

*John Wiley & Sons, Inc.*, 440 Fourth Ave., New York 16, N.Y. Book, "Managerial Control of Business" written by the staff of Trundle Engineering Co., Cleveland, Ohio. A composite survey of management techniques covering 28 years of management engineering experience.

*John Wiley & Sons, Inc.*, 440 Fourth Ave., New York 16, N.Y. Book, "Industrial Electronics Reference Book," by 37 electronic engineers of Westinghouse Electric Corp. Presents information on all aspects of industrial application and design data of electronic apparatus. Each of these specialists writes about the phase of this science in which he is adjudged a competent authority. Price $7.50.

# Pulp and Paper Manufacture in the U. S.

## September 1948

***As Reported by Bureau of the Census, Industry Division, Paper and Printing Unit***

**(Tabulation on Page 8)**

*Paper and Board Production* during September amounted to 1,808,517 tons, a decline of 68,252 tons from the August output, according to the Bureau of the Census, Department of Commerce. The decrease, shared by all sections of the industry, was due primarily to the shorter working month. Paper production, at 910,028 tons, was equal to 94.6 percent of the production base, and the ratio of paperboard output to the base was 90.1 percent. Building board production was in excess of 99 percent for the third straight month, as this section of the industry continued to operate near capacity.

*Pulpwood Receipts* during the month, though below those of August, were sufficient to meet consumption requirements of 1,747,401 cords, and at the same time, increase the month-end stocks of wood to a new record high of 5,604,814 cords. Except for the Southern regions where inventories showed a slight decrease, all areas reported an increase in pulpwood inventories.

*Receipts of Fibrous Materials* other than wood pulp during September were 71,767 tons below those in August. This decrease was due principally to the usual seasonal decline in the receipts of straw and other agricultural waste products. Waste paper receipts were above those of August and stocks were equivalent to approximately 20 days' supply, based on the September rate of use.

*Wood Pulp Production* in September, at 1,059,029 tons, was 83,112 tons below the record high set in August. Compared with the production base, the September ratio of 90.9 percent was 3.5 percent below the August rate of activity. Production of the sulphate grades dropped 54,527 tons from last month's high, accounting for most of the decline.

*Wood Pulp Inventories* at paper and board mills dropped 12,325 tons below those of August as the consumption rate exceeded receipts. The decrease of month-end stocks of wood pulp at paper and board mills was general for all classes of mills. Pulp mill inventories remained practically unchanged.

*Material Consumption and Product Output* ratios remained rather constant, with wood pulp accounting for 46 percent of the total fibrous material "furnish" for paperboard and 76 percent of the fibrous material content of paper. The comparative August ratios were 48.5 percent for paperboard and 75 percent for paper.

# Further Duty Rate Reductions Proposed

NEW YORK—In a "Special Report on Further Duty Reductions Proposed for Paper and Paperboard," Warren B. Bullock, manager of the Import Committee of the American Paper Industry, on November 8, said:

"Hearings will begin on December 7, 1948, at Washington on proposed reductions of duty rates on the following papers and paperboards:

"Plain paperboards, cardboard, pulpboard and fibreboard, except strawboard and leather board, but including beer mat board; present duty ten percent ad valorem.

"Kraft wrapping paper, present duty 20 percent.

"Other wrapping paper, present duty 25 percent.

"Glassine, present duty three cents per pound and 15 percent.

"Imitation parchment and greaseproof papers, present duty three cents per pound and 15 percent.

"Gummed paper, present duty five cents per pound.

"Drawing papers valued at under 40 cents per pound; present duty three cents per pound and 15 percent.

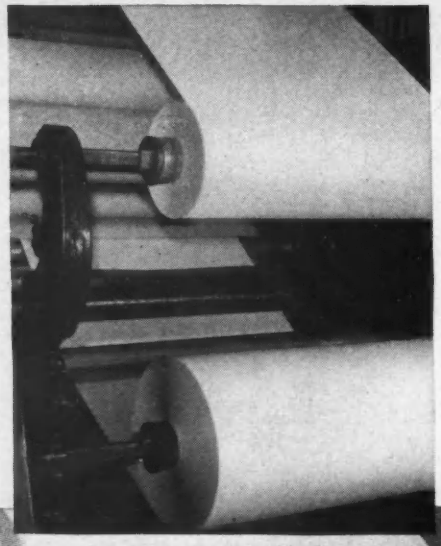
"Cloth-lined or reinforced papers, present duty five cents per pound and 17 percent.

"Under the law the duty rate on these papers may be reduced 50 percent.

"There will be two sets of hearings, one before the Committee for Reciprocity Information, the other before the United States Tariff Commission, all hearings beginning the same day. Domestic industry may file briefs or present oral testimony or both for either or both hearings.

"The hearings are part of an expanded program for tariff rate reductions under the Reciprocal Trade Agreement Act, and are the preliminaries to negotiations beginning at Geneva, April 11, 1949, with 11 nations which were not participants in the 1946-47 Geneva trade agreement conferences. The proposed reductions on rates of duty on paper are listed for negotiation with Denmark, Finland, Sweden and Italy. However, any duty rate reductions granted these countries automatically apply to all other countries, under the most favored nations treaties.

"In anticipation of such additional tariff rate reductions as are now to be negotiated, the Import Committee has been compiling data for use by the industry in such presentations as may be made at Washington."



*from a printer's viewpoint: paper coated with*

# DOW LATEX 512K

***. . . presents an exceptionally smooth printing cushion***

Printers prefer paper coated with Dow Latex 512K—**for clean, sharp highlights in halftones and a superior printing cushion.**

Dow Latex 512K flows under the heat, friction and pressure present in the supercalendering operation. The result is a smooth, glossy coated surface having sufficient softness to make an excellent printing cushion. This combination gives sharper definition to highlights in halftones. Offer these advantages to your customers without increase in cost.

For complete information, contact your nearest Dow Sales Office today!

*Coatings Section • Plastics Division, Dept. PC-19*

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

DOW

New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago • St. Louis • Houston • San Francisco • Los Angeles • Seattle • Dow Chemical of Canada, Limited, Toronto, Canada

SECTION OF THE

TECHNICAL ASSOCIATION
OF THE PULP AND PAPER INDUSTRY

122 E. 42nd ST., NEW YORK 17, N. Y. Edited By R. G. MACDONALD, Secretary

# Fundamental Physical — Chemical Characteristics of Melamine Resin Acid Colloid*

By J. K. Dixon[1], G. L. M. Christopher[1], and D. J. Salley[1]

## Abstract

*Melamine-formaldehyde acid colloid has been studied by a number of physical-chemical methods. The monomer of trimethylolmelamine in solution behaves as a weak base and forms a completely dissociated salt with an acid. The viscosity of the acid solution of the monomer increases with time, suggesting that polymerization is occurring, and the accompanying decrease in pH indicates that the polymer is a weaker base than the monomer. Anions are bound to the polymer, and the extent of binding as a function of the age and concentration of the solution has been examined by conductivity, self-diffusion, and electrical transport methods, the latter two involving radioactive tracer techniques. The strength of binding depends on the kind of anion present, sulphate being more strongly attached than chloride. The polymer in solution has a net free positive charge which decreases with age. On the other hand, cataphoretic and streaming potential measurements indicate that the polymer-pulp adsorption complex has a positive charge which increases with age of the polymer. Combined diffusion and viscosity studies have indicated that the polymer is a cigar-shaped molecule of relatively small size, containing only 10 to 20 monomer units at the most. Electron micrographs tend to confirm this but suggest that the polymer may be somewhat larger. The general picture obtained is that during polymerization the monomer units are joined together by splitting out water and formaldehyde, and that they stack up on one another like a pile of doughnuts to form a long cylinder. The bringing together of charged monomer units to form the polymer would result in the development of a high electrostatic charge density. In order to relieve this inherently unstable electrical condition protons are expelled from the polymer and anions are bound. There remains a small net free positive charge on the polymer,*

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Hotel Commodore, New York, N. Y., Feb. 23-26, 1948.

[1] Stamford Research Lab., American Cyanamid Co., Stamford, Conn.

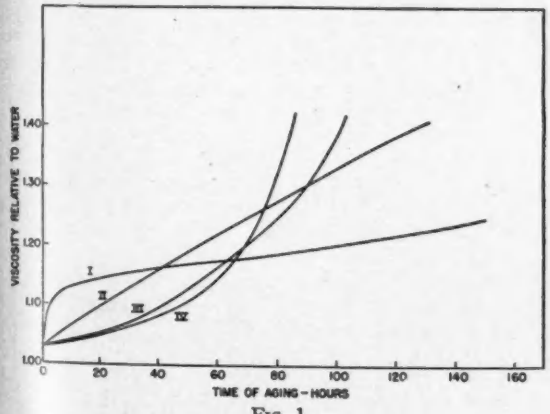



FIG. 1

Increase in Viscosity of TMM-HCl Solutions With Time. Solutions Aged at 12% solids; Viscosities Run at 1%
Curve I —HCl/TMM = 0.6
Curve II —HCl/TMM = 0.8
Curve III—HCl/TMM = 1.0
Curve IV—HCl/TMM = 1.2

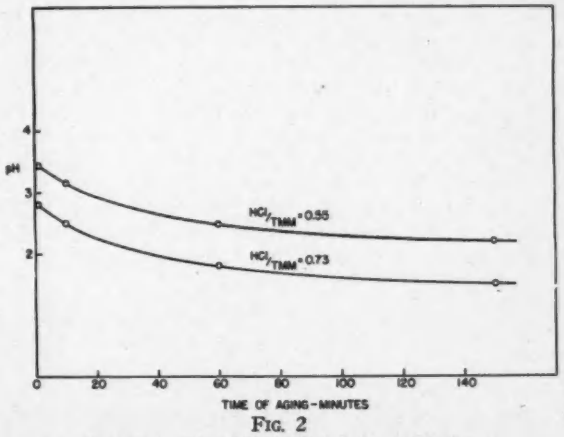



FIG. 2

Decrease in pH of TMM-HCl Solutions with Time.

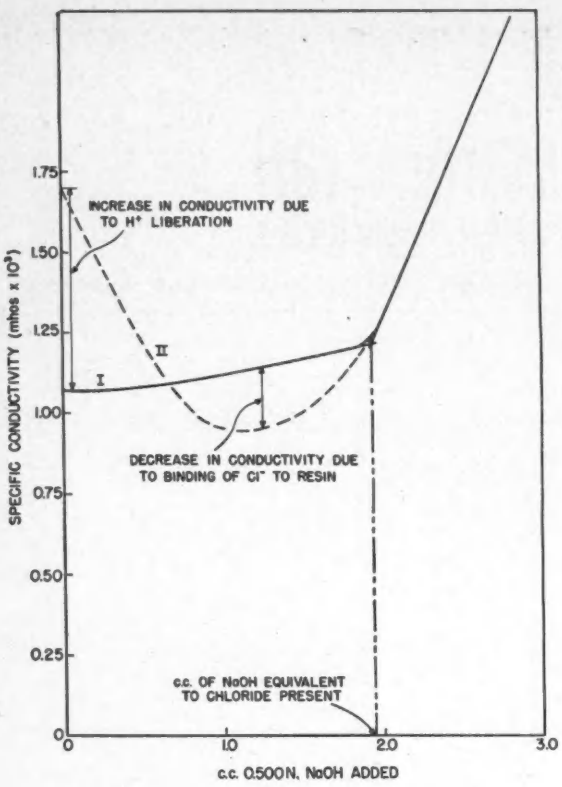

INCREASE IN CONDUCTIVITY DUE TO H+ LIBERATION
DECREASE IN CONDUCTIVITY DUE TO BINDING OF Cl- TO RESIN
c.c. OF NaOH EQUIVALENT TO CHLORIDE PRESENT
SPECIFIC CONDUCTIVITY (mhos x 10³)
c.c. 0.500N. NaOH ADDED
I
II

FIG. 3

Changes in Conductometric Titration Curves with Time of Aging of TMM-HCl Solutions. Solution aged at 12% solids; HCl/TMM = 0.6.
Curve I —fresh solution
Curve II—after 23 hours aging

*which varies with age, concentration, etc. The relationships of the above physical-chemical data to the wet strength produced in paper is discussed.*

Trimethylol melamine, a formaldehyde derivative of melamine, yields a water-soluble colloidal polymer when polymerized under suitable conditions in relatively strong acid. This colloid possesses the useful and important property of imparting wet strength to paper when added to pulp in the beater. Although the practical value and the methods of applying this resin have been described in a number of publications from this laboratory *(1,2,3)*, there have been but few preliminary references to the basic physical-chemical characteristics of the polymer. Concurrent with laboratory and mill application work, an intensive investigation has been in progress in this laboratory for a number of years on these more fundamental aspects, and we present here a review of the results of these studies. A recent paper by Steenburg *(4)* describes certain colloidal properties of the trimethylol melamine polymer which are consistent with the picture presented herein.

## General Discussion

The preparation of melamine-formaldehyde colloidal polymer is simple. One mole of the trimethylol melamine (TMM) is dissolved in water at, say, 12% by weight concentration and 0.8 mole of HCl is added. The polymer forms spontaneously and readily at 25°C. and after several hours the resin has reached a stage where, when applied in the beater, it is capable of imparting appreciable wet strength to paper. Variations of the above formulation are possible, of course, and the effects of other temperatures, acids, resin concentrations, etc., have been described in detail in previous publications from this laboratory *(2,3)*, these factors will therefore not be discussed except insofar as they have a direct bearing on the work described herein. Although the results of the present work were obtained with TMM, similar conclusions apply to a partially condensed resin such as Parez 607.*

## Reaction of Acid with TMM Monomer

Trimethylol melamine (and other similar derivatives of melamine) when dissolved in water behaves as a weak base. Its basic strength has been determined both by electrometric titration and by ultraviolet spectroscopy (5) and is about that of pyridine. When acid is added to such a solution, one equivalent of acid reacts with each mole of TMM to form a completely dissociated salt. The following equilibria describe these processes.

Equation (1) shows the addition of water to the form R to give RHOH in a manner analogous to the reaction of ammonia with water to give $NH_4OH$ in solution. Equation (2) represents the reaction of the base RHOH with hydrochloric acid and also the dissociation of the resulting salt RHCl; these reactions are similar to those for ammonium hydroxide when it reacts with HCl. The dissociation constant of the base, RHOH, is given as $k_b$ by equation (3) and this, together with the amounts of TMM and HCl used in preparation of solution determine, of course, the initial pH. Although for clarity, equation (1) represents the water molecule attached to a side chain N atom, it is not known which N atom (ring or side chain) is involved. The same applies to the ion of the salt, $RH^+$.

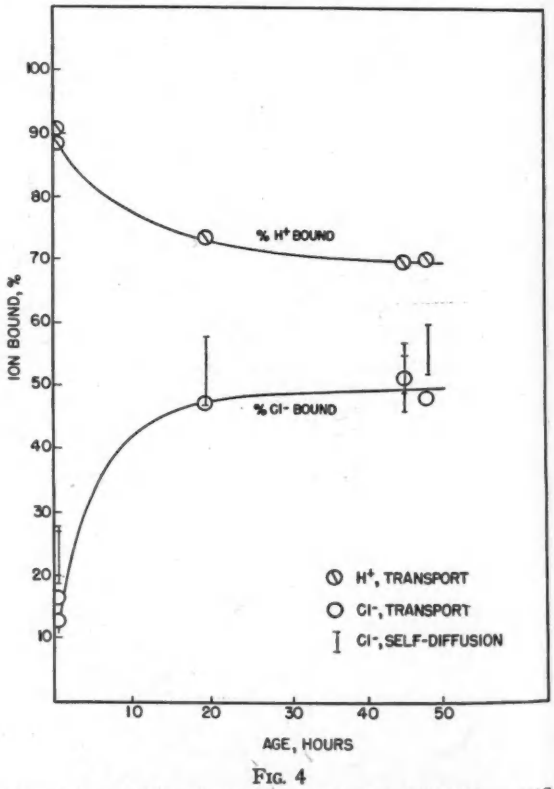



FIG. 4

Effect of Age on % Ions Bound. Solution Aged at 12% Solids at 29°C.; HCl/TMM = 0.8; all determinations made at 1.2% solids.

* Commercial product of the American Cyanamid Company.

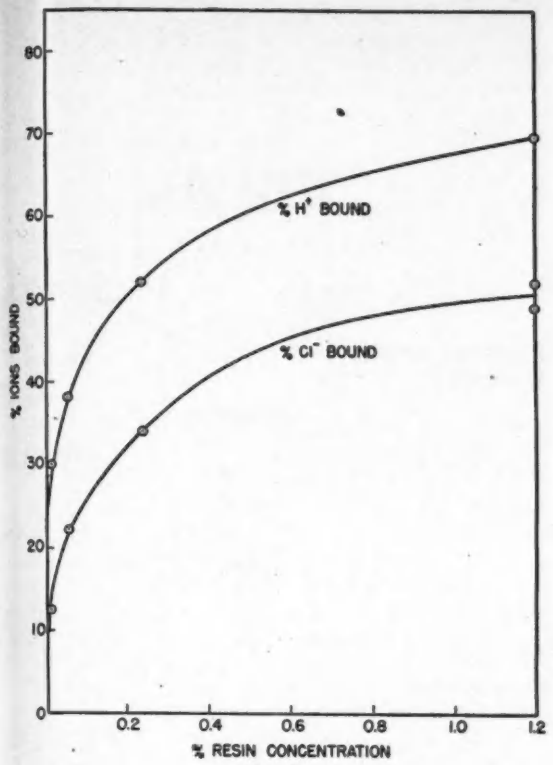



FIG. 5

Effect of Resin Concentration on Binding of Hydrogen and Chloride Ions. Solution aged at 12% solids for 48 hours at 29°C.; HCl/TMM = 0.8.

## Change in Polymer Solution During Aging

It must be emphasized that the equations above represent only the first steps in a series of events which, when the TMM and acid concentrations are properly adjusted, results finally in a material capable of imparting wet strength to paper. That these changes involve the formation of polymer may be inferred from a study of the viscosity characteristics of the solutions.

The change with time of the viscosity of an acid solution of trimethylol melamine may be illustrated by Fig. 1, in which the viscosity of the solution relative to water is plotted against time in hours. The solids concentration at which the solutions were aged was 12%, but the viscosities were actually run at 1% with an Ostwald viscosity pipet. Curves of a similar nature may also be obtained at the higher concentration and other conditions. For the molar ratios of acid to solids shown, the viscosity increased continually, although at rates varying with this ratio. The increase in viscosity is believed to be a clear indication of polymer formation, as it is in the case of other polymer systems, for example styrene.

Accompanying the above changes is a decrease in pH of the solution by as much as 1 to 2 units from the initial value; an example is shown in Fig. 2. This indicates that the polymer is a weaker base than the monomer, assuming, of course, that there is no change in the number of groups available for combination with acid. The equation for the reaction of the polymer with acid, analagous to equation (2) for the monomer, is:

$$R_n(HOH)_n + nH^+ + nCl^- \leftrightarrows (RHCl)_n + n(H_2O) \leftrightarrows R_nH_n^+ + nCl^- + n(H_2O) \quad (4)$$

However, it is now not possible to determine a well-defined basic dissociation constant of the polymer by the methods used for the monomer. The ultraviolet absorption method fails since the spectrum changes very little with aging. Electrometric titration is not applicable, first because the solution probably contains polymer molecules of various sizes as well as residual monomer, and second because the dissociation of the polymer hydrochloride, $(RHCl)_n$, is not complete.

## Dissociation of the Polymer Hydrochloride

The fact that the polymer salt is not fully dissociated, or from the opposite viewpoint, that the polymer binds some chloride ions electrostatically, is of considerable importance to the final picture of these solutions. Consequently, the extent of dissociation has been examined by three methods, conductometric titration, electrical transport and self-diffusion, of which the latter two have yielded reliable quantitative results.

The conductance of a freshly prepared TMM-HCl solution, when titrated with alkali, yields curve I of Fig. 3, indicating that all of the chloride ion is free in solution. After aging, the conductivity increases because of the increase in concentration of the highly conducting hydrogen ion. The titration curve for the aged solution, II of Fig. 3, shows a drop at first as the acid is titrated, but then dips below that of the unaged resin before again turning upward. This behavior shows that the resin salt is only party dissociated.

The determination of the extent of binding of anions by the self-diffusion and by the electrical transport methods has been carried out by two new techniques. The former involves comparison of the diffusion coefficient of the chloride in the TMM-HCl solution with that in a solution of completely dissociated electrolyte such as NaCl; the binding makes the coefficient smaller in the TMM-HCl solution. It is, however, not sufficient simply to diffuse the polymer chloride solution into water or salt solution because the complex and un predictable electrical effect due to the diffusion of other

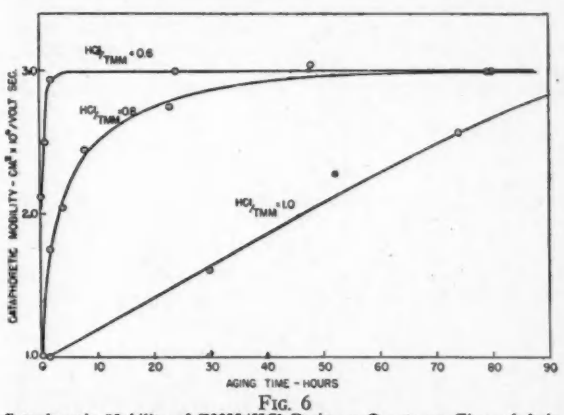



FIG. 6

Cataphoretic Mobility of TMM/HCl Resin on Quartz vs. Time of Aging

charged particles prevent quantitative interpretation. This difficulty has been completely overcome in the present work by studying self-diffusion with the aid of a radioactive tracer for the chloride ion. It is of interest that radiobromide may serve as a tracer for chloride in this connection. A diffusion cell consisting of two compartments, separated by a fritted glass disk is employed. Both compartments are filled with solutions of identical composition, but one contains an extremely small amount of radioactive tracer. The rate of appearance of radioactive ions in the other compartment is obtained by counting with a Geiger counter, and from this the diffusion coefficient may be calculated.

In the electrical transport method, the velocity, in an electric field, of the chloride in the polymer solution is compared to its velocity in a completely dissociated elec-

trolyte, the latter of course being the larger. Again, however, a simple electrolysis experiment is not sufficient for the complex TMM-HCl solution and again a radioactive tracer eliminates the difficulty. A special electrolysis cell called the "analytical boundary" cell is used. Essentially, a determination is made of the amount of tracer element passing through a sintered glass membrane during electrolysis, the solution on the two sides of a membrane being identical except for the radioactive element.

A detailed description of the experimental procedures and treatment of the data for the two methods, as applied to colloidal electrolytes in general, is in press (6, 7), and further account of the application to the TMM-HCl solutions at hand may be dispensed with. These two methods using the radiotracer technique appear to provide important new tools for the study of ionic-type resin solutions (proteins and dyestuffs for example) which could not be investigated readily by other methods.

The results obtained from the self-diffusion and the electrical transport experiments on aged TMM-HCl solutions are shown in Fig. 4, where the per cent of chloride bound is plotted against time of aging. All of the samples were aged at 12% resin concentration and at a molar ratio of acid to resin of 0.8. Also included in the figure is a curve for the per cent of hydrogen ion bound, which was calculated from the electrical transport experiments. Calculations of the pH of the solutions from these data give agreement with the observed pH within 0.1 to 0.2 units.

From the curves in Fig. 4 it is observed that the unaged resin is essentially a solution of the fully dissociated monomer hydrochloride. As aging proceeds, the bound hydrogen ion decreases and the bound chloride ion increases, each approaching an asymptotic value. The difference between the final hydrogen and chloride bound therefore gives the free charge on the average monomeric unit of the polymer, and if the molecular weight is known, the total charge on the polymer may be obtained. Here, the fact that more hydrogen than chloride is bound indicates that the charge on the polymer is positive. This is confirmed by electrophoresis studies described below.

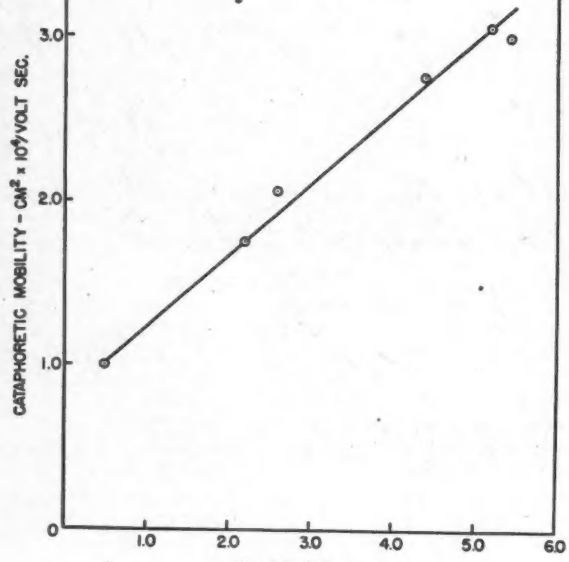



FIG. 7
Cataphoretic Mobility of TMM-HCl Resin on Quartz vs. Wet Strength. HCl/TMM = 0.8

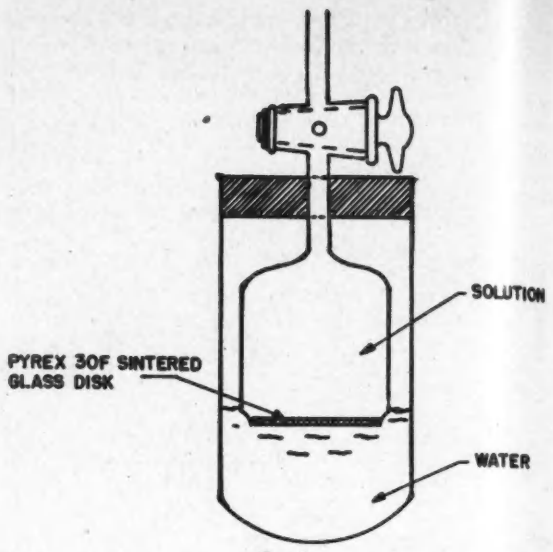



FIG. 8
Diffusion Cell.

The curves of Fig. 4 were obtained at a resin concentration of 1.2%. As would be expected from mass law considerations, increasing dilution sets free some of the bound hydrogen and chloride ions. This effect is shown in Fig. 5. It is interesting to note that the net charge on the resin is nearly independent of the concentration and depends only on the age of the resin solution. However, it is expected that the net charge on the resin is dependent on the acid-resin molar ratio.

In the foregoing the chloride was treated as bound to the resin by an ionic, not a covalent, linkage. The fact that mere dilution of the solution set free some of the bound chloride was evidence in this direction. Furthermore, in carrying out conductometric titration with mercuric perchlorate as titrant over 99% of the chloride was found available for rapid and complete reaction. If the chlorine had been bound through a covalent link, no reaction with this reagent would have occurred. Finally, in the electrical transport experiments with radiobromine as a tracer for the chlorine the same results were obtained no matter whether the TMM-HCl was made up with radiobromide and then aged or whether the radiobromide was added to a resin solution after aging. This result indicates a complete and rapid exchange of the anions which could only occur if the chlorine were ionically bound.

By using the tracer methods with radiophosphate and radiosulphate, it was shown that the degree of binding of anions to the polymer depends on the kind of anion. For example, phosphate is less strongly bound than chloride; in one instance only 0.3 equivalents of phosphate were found attached per monomer unit in a well-aged resin, as compared with an estimated 0.5 equivalents for chloride at the same concentration. On the other hand, sulphate ion is strongly held, and displaces chloride from the polymer in a solution containing both. In one experiment in which a sulphate concentration of 20 p.p.m. was established in a solution of well-aged TMM-HCl, 69% of the available sulphate was bound while the amount of available chloride held was reduced from 13% to 6%. In another case, where the free chloride to free sulphate in solution was 80 to 1, over

twice as much sulphate as chloride was attached to the resin. The increased binding of sulphate has the additional effect of increasing the number of hydrogen ions bound, without at the same time increasing the free positive charge on the polymer, Apparently, in fact, at sufficiently high sulphate concentration the free positive charge of the polymer is reduced to a point where coagulation of the resin is permitted. These relationships of type of anion, degree of binding, and free charge are of importance to the understanding of the effect of salts on the development of wet strength *(21)*.

## Determination of Kind and Amount of Charge on Resin-Pulp Systems

The discussion of the preceding section indicated that the polymer has a positive charge. This was further demonstrated by simply electrolyzing a 3% solution in a suitable U tube. The solution separated from around the cathode contained resin, as shown by nitrogen or ultraviolet spectrophotometric analysis, while the anode compartment contained only a negligible amount.

The fact that the resin was positively charged while the pulp was known to be negatively charged suggested that the electrostatic properties of the pulp-resin system might be of importance in wet-strength. These electrostatic characteristics of the pulp plus resin and of the pulp alone were studied quantitatively by measuring the so-called streaming potential developed when water is forced through a plug of pulp. Simple, well-known procedures *(8)* were employed. The sample of paper fiber was held in the form of a plug between two platinum gauze electrodes in a tubular glass cell. The conductivity of the solution flowing and the electric potential generated were measured simultaneously. Provision was made for maintaining a constant flow of solution, and the resulting constant pressure drop through the paper plug was measured. It was possible to flow different solutions in succession through the paper plug, for example, resin solution and then dilute acid.

The zeta potential, $\zeta$, which measures the electrostatic potential developed between the streaming solution and pulp surface is computed from the well-known Helmholtz formula

$$\zeta_s = \frac{4\pi E L \eta}{PD} \qquad (5)$$

where $E$ = observed streaming potential across the plug of pulp
$\eta$ = viscosity of the solution
$L$ = measured (specific) electrical conductivity of the streaming solution
$D$ = dielectric constant of the solution
$P$ = measured pressure difference across the pulp plug.

For water at 25° C.

$$\zeta_s = 1.06 \times 10^5 \frac{EL}{P} \qquad (6)$$

The results obtained with bleached kraft pulp are shown in Table I. As usual, the resin was aged at 12% solids and an acid-resin ratio of 0.8. Samples at different ages were diluted to 12% with 0.1 N HCl and water to give a 0.012% resin solution at a pH of about 3.8 (about beater concentration). First, about 750 ml. of this dilute resin solution was run through the diaphragm of pulp, thus making available about 10% resin on the fiber. Then the potential and conductivity were determined with $6.7 \times 10^{-4}$ N HCl streaming through the pulp. It was also found, however, that the zeta potential against the dilute resin solution itself was the same within experimental error.

TABLE I.—STREAMING POTENTIAL OF BLEACHED KRAFT PULP TREATED WITH 0.012% PAPER RESIN TMM SOLUTIONS AGAINST $6.7 \times 10^{-4}$ N HCl

| Sample No. | Age, hr. | E, mv. | P, cm. Hg. | $\zeta$, mv. |
|---|---|---|---|---|
| 71-80C | 0.55 | 1.0 | 19.0 | + 1.5 |
| D | 3.51 | 4.0 | 18.5 | + 6.5 |
| E | 19.7 | 6.0 | 18.0 | +10.8 |
| F | 48.0 | 6.5 | 17.7 | +10.8 |
| None | none | —2.0 | 19.5 | — 3.1 |

TABLE II.—COMPARISONN OF CATAPHORETIC MOBILITIES OF COTTON AND QUARTZ PARTICLES IN THE PRESENCE OF TMM RESIN

| Sample No. | Mobility, cm.²/volt sec. × $10^{-4}$ Cotton | Quartz |
|---|---|---|
| 71-47A | +1.68 | +1.71 |
| 71-41F | +3.01 | +3.01 |
| 71-48A | +2.61 | +2.53 |
| No resin | —3.8 | —0.5 |

The results indicate that the kraft pulp has a negative zeta potential, and that by addition of the resin, the potential acquires a positive value. Furthermore, the magnitude of the positive potential increases with aging of the resin. Since in these experiments the amount of resin adsorbed on the pulp must have increased as a function of resin age, the results suggest that there might be a relationship between zeta potential and retention and, therefore, between zeta potential and wet strength imparted to paper by the resin.

Much can often be learned regarding colloidal systems by investigating their cataphoretic mobilities under a variety of conditions; the methods of measurement have been described adequately *(9, 10)*. If proper precautions are taken to observe colloidal particles moving at a definite depth from the top face of a thin, glass, cataphoresis cell, the observed migration velocity and direction of motion are measures of the amount and kind of charge on the colloidal particle. Unfortunately, paper fibers are too long to use in the thin cataphoresis cells employed in this work so that no actual cataphoretic observations on resin-paper fiber particles have been made. However, some results using quartz and ground cotton fibers suggest relationships of importance to systems containing paper.

Investigations of other colloidal systems, especially those involving proteins adsorbed on small discrete particles, indicate that: (1) the mobility of a charged colloid is independent of its size and shape and (2) the

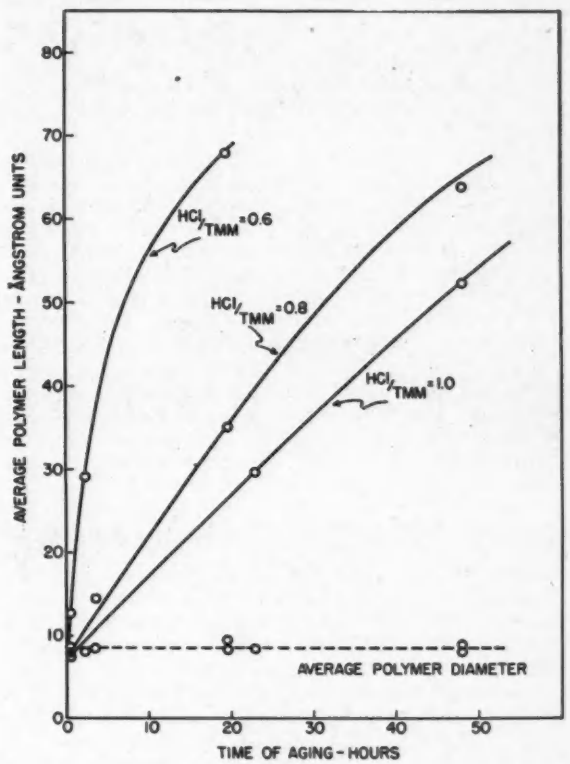



FIG. 9
Change in Average Polymer Dimensions with Age of Solution.

mobility is proportional to the zeta potential. It is shown in Table II that the mobility of a system of TMM polymer adsorbed on quartz or on cotton is the same, suggesting that the behavior of the quartz-resin system is close to that of cotton-resin. Since it is believed that cotton and paper are similar, the results of such cataphoretic experiments on quartz are of direct interest in the wet-strength paper problem.

The effects of acid: resin ratio and time of aging of the resin adsorbed on quartz are illustrated in Fig. 6. The curves indicate an increase in mobility with aging. That time of aging has qualitatively the same effect on mobility and on the wet-strength of paper sheet treated with resin of similar properties, is illustrated by the data presented in Table III and in Fig. 7.

TABLE III.—MOBILITY ON QUARTZ, AND WET STRENGTH AND RETENTION ON PAPER FIBER VS. AGE FOR TMM RESIN. AGED AT 12% SOLIDS, ACID/RESIN = 0.8

| Age, hr. | Mobility on Quartz, cm.$^2$ × $10^{-4}$/volt secs. | Wet Strength of Paper, lb./inch | % Resin on Paper Fiber |
|---|---|---|---|
| 1.8 | 1.75 | 2.2 | 1.5 |
| 3.75 | 2.05 | 2.6 | 1.6 |
| 7.5 | 2.45 | 3.8 | 1.7 |
| 23.3 | 2.75 | 4.4 | 1.9 |
| 47.3 | 3.04 | 5.2 | 1.9 |
| 77.3 | 3.00 | 5.4 | 2.1 |

The above table shows that the mobility (and hence the zeta potential) of the quartz-resin particle increases with time of aging of the resin, in qualitative agreement therefore with the streaming potential experiments of Table I, on pulp-resin systems. This increase in zeta potential takes place in spite of the fact that, as shown in an earlier section, the positive charge per monomer unit of the polymer in the solution actually decreases with age. Apparently in the present system the charge density of the adsorption complex, which is related to the zeta potential, is not quantitatively defined by the charge of the polymer before adsorption. This is at variance with the general view, as expressed by Abramson, Moyer, and Gorin *(10)*, that when proteins and other charged colloids are adsorbed by solids the charge on the colloid is but little changed during adsorption and the electrokinetic behavior of the adsorption complex is determined principally by the colloid being adsorbed. Here, the fact that the amount of resin retained by pulp (last column, Table III) increases with age suggests that an increase in adsorption with aging accounts in part for the observed increase in zeta potential. More important, it should be emphasized that when resin is adsorbed by pulp a new resin-fiber colloid is formed and the resin is strongly held in an essentially irreversible manner. The strong resin-fiber interaction thus evidenced may greatly influence the magnitude of the charge density on this new system so that the charge on the resin prior to adsorption may not necessarily be the sole factor governing the zeta potential of the new fiber—resin colloid. Undoubtedly the nature of the resin before adsorption must affect the charge of the system after adsorption ,but the relationship is too complicated to be identified at this time.

## Size and Shape of TMM—Acid Colloid Particles

Since polymerization occurs in the aging of TMM-HCl systems, it was of interest to determine the average size and shape of the polymer molecule and to correlate these properties with the ability of the resin solution to impart wet-strength to paper.

Because of the presence of a high concentration of electrolyte in an unknown state of combination, the usual thermodynamic methods for determining molecular size such as freezing point, vapor pressure, etc., are not suitable in this system. However, certain combinations of kinetic measurements, such as have been utilized in studies of proteins, viruses and organic high polymers, can be applied in determining the molecular weight and shape of the polymer *(11)*. One of the more satisfactory of these makes use of a combination of diffusion and viscosity data. Both of these measurements may be made with relative ease with the resin solutions in question and the application of the data obtained in determining an approximation of polymer size and shape is given below.

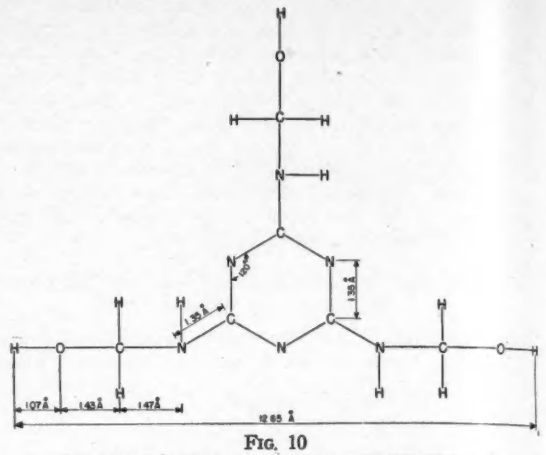



FIG. 10
Scale Model of Trimethylolmelamine (TMM) Molecule.

The diffusion coefficient of a solute, $D$, is defined as the number of moles which diffuse across a unit area in unit time under a concentration gradient of unity, and for spherical particles is related to the radius of the particles by an expression developed by Einstein *(12)*.

$$D = \frac{RT}{6\pi\eta N\rho} \qquad (7)$$

where $D$ is the measured diffusion coefficient
$R$ is the gas constant
$T$ is the absolute temperature, °K
$N$ is Avagadro's number
$\eta$ is the coefficient of viscosity
$\rho$ is the radius of the diffusing spherical particle

From this equation therefore it would be possible to calculate an average molecular size for the polymer on the assumption of a spherical shape. However, since many natural and synthetic polymeric materials are not spherical, diffusion measurements must be combined with another independent measurement, such as viscosity, which may be related to the shape of the polymer molecules.

Through the work of Svedberg *(13)*, Perrin *(14)*, and Herzog *(15)*, Einstein's original diffusion equation has been modified so that the measured diffusion coefficient is related to a dissymmetry ratios, $\rho$, and this in turn related to the axial ratios of the asymmetric molecules on the assumption that the molecules have shapes approximating prolate (cigar) or oblate (disk) ellipsoids of revolution. In the relationships which follow, equation (8) applies when the assumed molecular shape is that of a prolate ellipsoid, and equation (9) when an oblate ellipsoid is assumed.

$$\frac{\rho}{r} = \frac{\sqrt{1-(b/a)^2}}{(b/a)^{2/3}\,\dfrac{ln\,1+\sqrt{(b/a)^2}}{b/a}};\ b/a<1 \qquad (8)$$

$$\frac{\rho}{r} = \frac{\sqrt{(b/a)^2-1}}{(b/a)^{2/3}\ arc\ tg\ \sqrt{(b/a)^2-1}};\ b/a>1 \qquad (9)$$

In these expressions $\rho$ is the radius of the solute molecules as calculated from equation (7); $b$ is one-half the major axis of the ellipsoid of revolution and $a$ is

one-half the minor axis. The term $r$ is defined as the radius of a sphere having the same volume as that of the asymmetric molecule.

Values for the axial ratio of asymmetric molecules can be obtained from the determination of the viscosity of solutions of these molecules by making use of expressions developed by Simha *(16)*.

These relate the axial ratio of the solute molecules to the intrinsic viscosity; the latter is defined as

$$\lim_{C \to 0} [\eta] \equiv \frac{ln\ \eta_{rel}}{C} \equiv \frac{(\eta_{rel} - 1)}{C} \qquad (10)$$

where $\eta_{rel}$ is the viscosity of the solution relative to the solvent, and $C$ is the solute concentration in per cent. For a prolate ellipsoid

$$[\eta] = \frac{(b/a)^2}{15\left(ln \frac{2b}{a} - \frac{3}{2}\right)} + \frac{3(b/a)^2}{15\left(ln \frac{2b}{a} - \frac{1}{2}\right)} + \frac{14}{15} \qquad (11)$$

and for an oblate ellipsoid

$$[\eta] = \frac{16}{15} \frac{a/b}{\tan g^{-1} \frac{a}{b}} \qquad (12)$$

Time-saving tables are available in the literature from which, for any observed value of $\eta$, the value of $b/a$ may be obtained, hence the ration $\rho/r$. Then, since $\rho$ is known from the measured diffusion coefficient, the value for $r$ may be calculated, and finally the actual values of $b$ and $a$ computed. These methods of analyzing diffusion-viscosity data have been employed with success on proteins and viruses *(17, 18)*.

In carrying out the experimental work a McBain-Northrup type cell, illustrated in Fig. 8 was used for the determination of diffusion coefficients. The sintered glass plate in this cell serves only to prevent mixing of the resin solution and the reference liquid. TMM was aged at 12% concentration in the presence of suitable concentrations of HCl and after chosen periods of aging, samples were diluted with HCl so that the solids content was 1.2% and the HCl was 0.12 $N$.

These solutions were placed in the upper part of the cell and allowed to diffuse into O.12N HCl. This assured a nearly constant ionic strength of electrolyte across the glass membrane which is important for such colloidal systems. The amount of polymer diffusing was measured by analysis for nitrogen.

The viscosities of solutions made up as above were measured with an ordinary Ostwald viscometer. Both the aging of the solutions and the determinations of diffusion coefficient and viscosity were carried out at 28.97 ± 0.02°C.

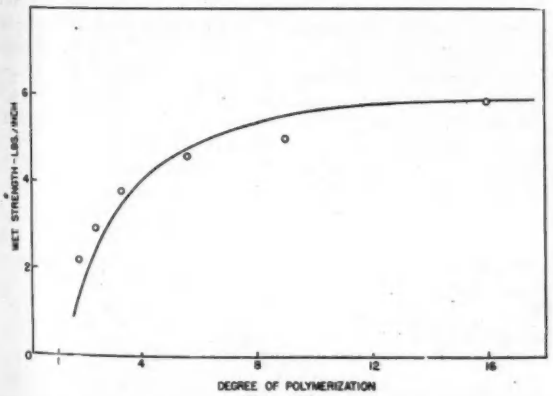



FIG. 11
Variation in Wet Strength with Degree of Polymerization. Points—experimental; curve—theoretical.

Summarized in Table IV are some results of diffusion and viscosity measurements carried out on solutions of TMM acid colloid as a function of acid-resin ratio and age. It is seen that the diffusion coefficient decreases and the intrinsic viscosity increases with time, and that the rate of change of these properties decreases with increasing acid-resin ratio.

From the measured values of $D$ and $[\eta]$ in Table IV the corresponding values for the hydrodynamic radius, $\rho$, the axial dimensions $b$ and $a$, and radius $r$ have been calculated according to equations (7) to (12). The calculations have been carried through for both models, the prolate and oblate ellipsoids. In the latter case the minor (shorter) half axis of the disk comes out to be 3.5 Å at low degrees of polymerization. With increasing polymerization this value gradually decreases to 1.8 Å. Since this low value is hard to visualize, from this consideration alone the prolate model is to be preferred, and consequently the data only for the prolate model are presented in Table IV and illustrated in Fig. 9.

TABLE IV.—SUMMARY OF DATA ON VISCOSITY AND DIFFUSION COEFFICIENTS OF TRIMETHYLOL MELAMINE RESIN

| Mole Ratio HCl/Resin | Age, hr. | $D$25° C. cm.²/day | $\rho$, Å | $[\eta]$ | $r$ | $a$ | $b$ |
|---|---|---|---|---|---|---|---|
| 0.6 | 0.55 | 0.445 | 4.6 | .029 | 4.5 | 3.7 | 6.4 |
| | 2.55 | 0.275 | 7.3 | .040 | 6.3 | 4.1 | 14.5 |
| | 19.5 | 0.159 | 12.1 | .079 | 8.5 | 4.2 | 34 |
| 0.8 | 0.55 | 0.475 | 4.3 | .024 | 4.3 | 4.3 | 4.3 |
| | 3.5 | 0.391 | 5.2 | .027 | 5.1 | 4.3 | 7.3 |
| | 19.7 | 0.231 | 8.6 | .0425 | 7.5 | 4.9 | 17.6 |
| | 48 | 0.164 | 11.7 | .078 | 8.1 | 4.0 | 32 |
| 1.0 | 23 | 0.269 | 7.4 | .040 | 6.4 | 4.2 | 14.8 |
| | 48 | 0.183 | 10.7 | .067 | 8.2 | 4.6 | 26.2 |

Figure 9 shows that during polymerization of TMM in HCl solution, the polymerizing molecule grows continually in length while the cross-sectional dimension remains about unchanged. The same type of polymerization appears to occur at all of the acid-resin ratios studied, although the growth of the polymer apparently is greatest at the lower acid concentrations.

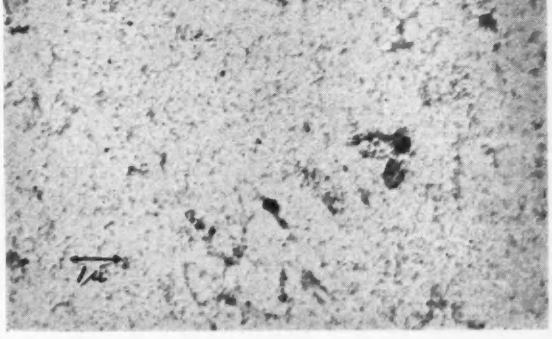



FIG. 12
Electron Micrograph of TMM-HCl Resin; 11,800X.

A molecular model of trimethylol melamine is illustrated in Fig. 10. This flat molecule might behave like a disk with an over-all diameter not greater than 12.65 Å and a thickness of the order of 4 to 8 Å. During polymerization the monomer loses water, or water and formaldehyde, and molecular models show that it is possible for the monomer units to pile up on one another to form a long cylinder. A constant diameter of about 8 Å is thereby indicated in approximate agreement with the figure of 8.4 Å obtained experimentally.

The average degree of polymerization, D. P., may be estimated from the above model by simply dividing the total length of the cylinder by the thickness of each monomer unit. Since this latter is 4 to 8 Å, and the

length of the well-aged polymer is about 60 to 70Å, the resulting value for D. P. is 8 to 18. Another way of arriving at this quantity is to calculate the volume of the well-aged polymer from the observed dimensions given in Fig. 9, a value of $3 \times 10^{-21}$ cm³ results. Then assuming that the density of the polymer has a reasonable value of 1.0, the average gram molecular weight is found to be 1800. Since the molecular weight of the TMM monomer in the polymer is from 170 to 200 depending on whether water or water plus formaldehyde is lost, then the average degree of polymerization becomes 9 to 11. This discussion indicates, therefore, that the polymer formed when TMM polymerizes in acid solution to give a water-soluble colloid, is relatively small and contains only 10 to 20 monomer units.

The results just presented show how certain average size and shape factors for the polymer vary with conditions of polymerization. There are, of course, corresponding data for wet strength of paper sheets formed from pulp and these polymers, so that it is possible to correlate wet strength with some factor such as degree of polymerization of the TMM. Figure 11 shows a plot of data in which paper pulp was treated with 3% by weight of resin. The points show that as the polymer grows the wet strength approaches a limiting value of

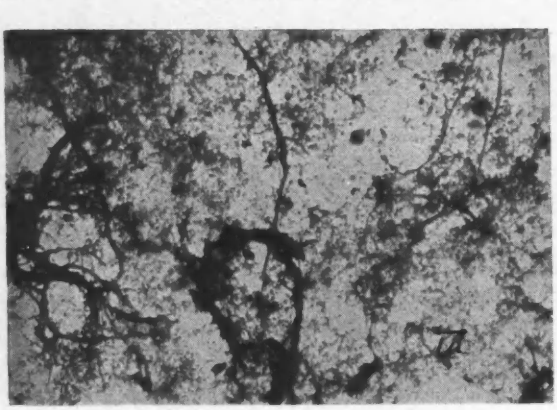


FIG. 13
**Electron Micrograph of Alpha-Pulp plus 3% TMM-HCl; 7,500X.**

around 6.0 lb./in. At low values of D. P. there may be a considerable amount of monomer and low polymer present which does not contribute to production of wet strength. In other words as long as the polymer is below some critical size, it does not give any wet strength and above such a critical value it does.

Under certain assumptions recent equations developed by Flory *(17)* can be used to calculate theoretical curves for D. P. vs. wet strength. It is assumed (1) the untreated sheet has a wet strength of 0.5 lb./in. (2) only polymers with D. P. equal to or greater than 4 give wet strength (3) that the weight fraction of resin with D. P. equal to or greater than 4 produces wet strength of 5.5 lbs. per inch for this particular case, where 3% total resin was applied, (4) the polymer is difunctional and (5) that each functional group can react independently. Under these conditions Flory's equations are applicable. On these assumptions one calculates the curve shown in Fig. 11 and it will be seen that this theoretical curve agrees well with the points which are experimental.

Unpublished information from this laboratory provides ample data to the effect that the amount of wet strength produced by the resin depends on the amount of resin retained by the paper. The correlation curve between wet strength and resin retention is essentially

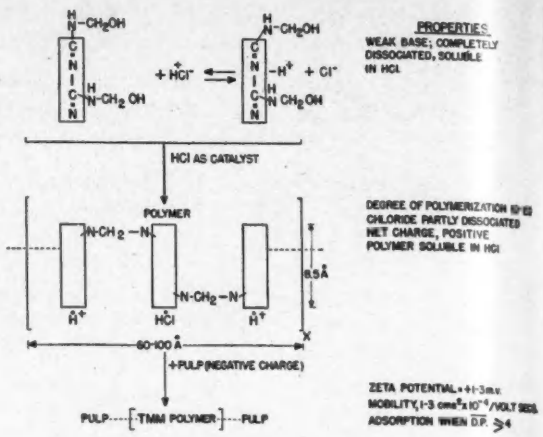



FIG. 14
**Schematic Representation of Wet Strength Resin Process.**

the same regardless of the aging time. This means that as soon as the polymer is adsorbed it is capable of producing wet strength. The analysis given above suggests that adsorption only occurs when the degree of polymerization exceeds four, in which case the adsorbed resin imparts the wet strength. Furthermore, it is also concluded that there is no adsorption so long as the charge on the polymer is too high, and that the attainment of the correct charge and size are really part of the same phenomenon, after which adsorption may take place with production of wet strength. However, the attainment of the proper size and charge by the resin particle does not necessarily mean that all of those particles will be adsorbed by paper pulp. As the amount of polymer adsorbed increases, the positive charge on the resin-fiber system also increases and this accumulation of charge may eventually prevent further adsorption of the resin onto the pulp because of repulsion of like charges. Actually, plots of the resin retained versus concentration of resin in solution shows that above a certain concentration the amount adsorbed remains constant, *(2, 3)*.

## Electron Microscopical Observations

An indication that the well aged TMM polymer averages about 60 to 70 Å in length has been obtained from the viscosity-diffusion measurements. Further evidence on this point is provided by electron microscopical studies of the polymer alone and in pulp suspensions. However, direct comparison between the two methods of measurement must be made cautiously because of the fact that in the preparation of specimens for the electron microscope the sample is dried, evacuated, and bombarded with electrons. What changes the size and shape of the polymer particle undergo in this treatment are difficult to predict. In Fig. 12 is shown an electron micrograph of a 0.02% solution of resin on a Formvar mount. A fine, particulate phase is evident with the majority of the particles lying between 100 and 200 Å. In this picture the resolution is about 100 Å, and there may be a considerable number of particles below this limit. This evidence tends to confirm the estimate of the particle size deduced from the viscosity-diffusion work, for any change in size brought about during the electron microscopical examination should be in the direction of aggregation and not dispersion.

Figure 13 shows an excellent example of an electron micrograph of a pulp specimen bearing adsorbed polymer. The visible resin is attached to the surface of the pulp fibrils, and again has a particle size in the neighbor-

hood of 100 to 200 Å, as was observed in the absence of pulp. Of interest is the fact that micrographs similar to these are obtainable even after repeated washing to the pulp, thus confirming other evidence of the strong and essentially irreversible nature of the attachment of resin to pulp. Also of interest is the location of the resin on the surface, since this is necessary to the concept that the resin produces wet-strength in the finished sheet by increasing the fiber-to-fiber bonding *(20)*.

### Summary of Results

Figure 14 shows diagrammatically the properties which were described above. The monomer is portrayed in an edge-on view and for simplicity the addition of monomer units is shown as resulting in the formation of methylene groups as connecting links.

As the TMM polymerizes in acid solution the concentration of free hydrogen ions in the solution increases indicating that the originally weakly basic monomer becomes a still weaker base during polymerization. The hydrochloride of TMM monomer is completely dissociated in solution but as polymerization proceeds the dissociation of the polymer hydrochloride decreases. This results in the binding to the polymer of a considerable portion of the available chloride ion. The chloride attached to the polymer is held by ionic forces rather than through covalent bonds. Experimentally it is found that the polymer always carries a net positive charge.

The above observations are explained on the basis that the bringing together of charged monomer units to form the polymer would result in the development of a high electrostatic charge density. In order to relieve this inherently unstable electrical condition protons are expelled from the polymer and anions are bound. The number of hydrogen ions bound is in excess of the number of bound chloride ions, thus resulting in a net free positive charge on the polymer.

The reaction between TMM molecules in acid solution produces a polymeric material in which the molecules appear to be built up of monomer units in such a way as to resemble a stack of doughnuts. That is, during polymerization the monomer units react with each other so that the polymer particles grow in length while maintaining a cross-section approximately equivalent to that of the monomer unit. Expressed as actual dimensions the average length of polymer molecules in a well-aged resin solution is about 60 to 100 Å while the cross-sectional diameter is about 8.5 Å. These dimensions correspond to an average degree of polymerization (number of monomer units contained in the average polymer molecule) of from 10 to 20. The average molecular weight then lies somewhere between 1700 to 4000. Electron microscopical examinations tend to confirm these dimensions.

In order for the polymer to adsorb on the paper fibers it must attain an average degree of polymerization which exceeds 4, at which time its length is 15 to 25 Å. Streaming potential and cataphoesis measurements show that when this polymer is adsorbed on pulp the resulting fiber-resin system has a positive charge. The accumulation of polymer on the surface of the fiber results in the development of a high electrostatic charge density which eventually prevents further adsorption. As the polymer ages its charge decreases and this is an aid in adsorption since it tends to reduce the accumulation of surface charge. The charge density on the surface probably influences the distribution of resin on the pulp. Since it is known that adsorption and distribution of polymer on the pulp are important in development of wet strength, then it is clear from the above considerations that the resulting wet strength must be dependent on the size and charge of the polymer.


### Acknowledgment

Various members of the staff of these Laboratories have contributed to the work outlined in this paper, and we wish to acknowledge their assistance. In particular, we should like to indicate the many contributions, both experimental and theoretical, of Dr. A. P. Brady (now at Stanford University, California). We are indebted to Dr. C. J. Burton for the electronmicrographs and their interpretation. Discussions with C. G. Landes and C. S. Maxwell were particularly informative and helpful. The Paper Chemicals Laboratory prepared all handsheets, and the Physical Testing Laboratory made all wet-strength tests. Finally, we should like to thank the Directors of these Laboratories for permission to publish the results.


### Literature Cited


1. Wohnsiedler, H. P., and Thomas, W. M., U. S. pat. 2,345,543 (March 28, 1947).
2. Maxwell, C. S., *Paper Trade J.* 116, No. 19: 39-42 (May 13, 1943). *Tech. Assoc. Papers* 26: 309-312 (June, 1943). *Pacific Pulp Paper Ind.* 17, No. 4: 6-8 (April, 1943).
3. Landes, C. G., and Maxwell, C. S., *Paper Trade J.* 121, No. 6: 37-46 (August 9, 1945).
4. Steenberg, B., *Svensk Pappenstidning* 49, No. 14: 311-323 (July 31, 1946).
5. Dixon, J. K., Woodberry, N. T., and Costa, G. W., *J. Amer. Chem. Soc.* 69, 599-603 (1947).
6. Brady, A. P., *J. Amer. Chem. Soc.* (in press).
7. Brady, A. P., and Salley, D. J., *J. Amer. Chem. Soc.* (in press).
8. Briggs, D. W., *J. Phys. Chem.* 32, 641-675 (1928).
9. Abramson, H. I., "Electrokinetic Phenomena," Chap. 3, Chem. Catalog Company, 1934.
10. Abramson, Moyer, Gorin, "Electrophoresis of Proteins," Chap. 3, Reinhold Publishing Company, 1942.
11. Cohn and Edsall, "Proteins, Amino Acids and Peptides," Reinhold Publishing Company, 1943.
12. Einstein, A., *Ann. Physik* (4) 17, 549 (1905).
13. Svedberg, T., and Peterson, K. O., "The Ultracentrifuge," Oxford Clarendon Press (1940).
14. Perrin, F., *J. de Phys. Rad.* 5, 497 (1934); 7, 1 (1936).
15. Herzog, Illig, Kudar, *Z. Physik. Chem.* A167, 329 (1934).
16. Simha, R., *J. Phys. Chem.* 44, 25 (1940).
17. Lauffer, M. A., *J. Amer. Chem. Soc.* 66, 1188 (1944).
18. Neurath, H., Cooper, G. R., Erickson, J. O., *J. Biol. Chem.* 138, 411 (1941).
19. Flory, P., *J. Amer. Chem. Soc.* 58, 1877 (1936).
20. Salley, D. J., and Blockman, A. F., *Paper Trade J.* 125, 35-40 (July 3, 1947).
21. Maxwell, C. S., and Reynolds, W. F., "The Effect of Salts on the Melamine Resin Wet Strength Paper Process," to be published in *Paper Trade J.*


## Identification of Organic Compounds

John Wiley & Sons has just issued its third edition of "The Systematic Identification of Organic Compounds," a laboratory manual by Ralph L. Shriner of the University of Iowa and R. C. Fuson of the University of Illinois (370 pp. 6 x 9). Among the subjects covered are: identification of unknowns; preliminary examination; determination of physical properties, qualitative analysis of the elements; the solubility classes; the preparation of derivatives; separation of mixtures; and the interpretation of experimental data. Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd Street, New York 17, N. Y. at $4.00 per copy in the U.S.A.

## Organic Reagents

Interscience Publishers has just issued "Organic Reagents" by John F. Flagg of the Research Laboratory, General Electric Company (300 pp. 6x9). The objective of this book is to describe the various organic reagents (precipitants) used in gravimetric and volumetric analysis, and to indicate the type of analytical procedure in which they may be used to advantage. This is the fourth in a series of monographs on analytical chemistry and its applications. Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd Street, New York 17, N. Y., at $6.00 per copy.

Supplying Your Requirements

# AMERICA'S LEADING INDEPENDENT WASTE PAPER PACKERS

WASHINGTON, D. C.
PHILADELPHIA, PA.
NEW YORK, N. Y.

THOMAS PAPER STOCK COMPANY
860 W. Evergreen Avenue • Chicago 22, Ill.

# NELIO

**is free from the defects of ordinary gum rosin!**

NELIO Gum Rosin offers distinct advantages for the manufacture of size. It is made by scientific methods, under strict laboratory control.

**NELIO offers economies** In addition to its exceptional uniformity and dependability, NELIO is less expensive to handle and use.

**UNIFORM**
The standard grades are unvarying in color and quality. Shipment after shipment will be identical.

**BRILLIANT**
Assuring consistently lighter grades of paper.

**DRY**
No need to worry about the turpentine content of NELIO —it's very low!

**CLEAN**
Not a trace of dirt or foreign matter because of careful processing in stainless steel equipment.

**FULL-WEIGHT**
Shipped in standard, non-absorbent leak-proof metal drums, in 100 lb. net weight paper bags or in fluid state in insulated tank cars.

IF YOU NEED TECHNICAL SERVICE—We offer you a consulting service with experienced paper technicians on request.

*Write for Samples and Prices*

**NELIO is manufactured by THE GLIDDEN COMPANY, NAVAL STORES DIVISION and sold by**

# E. W. COLLEDGE

**General Sales Agent, Inc.**
**JACKSONVILLE 1, FLORIDA**

| NEW YORK 17 | CHICAGO 4 | CLEVELAND 14 | SAN FRANCISCO 5 |
|---|---|---|---|
| 52 Vanderbilt Ave. | 25 E. Jackson Blvd. | 807 Guardian Bldg. | 503 Market St. |

# THE PROGRESS OF PAPER

**PAPYRUS TO PARCHMENT TO PAPER**
**2000 B.C. TO 1947 A.D.**

**BRIEF SUMMARY OF CONTENTS**

**Map of origin of paper, Egypt to the Near East. Also map of area of invention and progress of production. Illustrated with drawings and photographs of actual material, some of ancient origin, dating from 2000 B.C. to 1300 A.D.**

European development.

Spain, Italy, Greece, France, Belgium, Holland, Germany, Poland, Russia, England, to 1800 A.D.

Invention of machines, expansion in Europe with many odd facts to 1850 A.D.

Advancing mechanical progress brings more inventions abroad—to 1875 A.D.

American phase of transition, 1690-1775.

Improvements of paper in America after the Revolution.

An infant industry gradually becomes larger—development of American mills, 1800-1850.

*—and many other subjects.*

**Spiral Bound Paper Cover—$5.00**

**ORDER YOUR COPY TODAY—**

**De Luxe Edition bound in blue cloth—$12.50**

**THE LOCKWOOD TRADE JOURNAL CO., INC.** **15 West 47th St., New York 19, N. Y.**